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SESSION III: PUBLIC SERVICES AND NON-PROFIT SECTOR

Prologue

The organizers of the traditional "Šlapanice" seminar have asked me to write the foreword to these proceedings. The seminar is celebrating its 20th anniversary this year and, they say, I was present at its birth. So here I am, having been officially declared to be an eyewitness, which has made me little bit broody.

Twenty years ago, when we started inviting our colleagues from affiliated departments and institutes engaged in the teaching and research of public sector economics to Šlapanice, not even the founder of our field of studies, the legendary Professor Yvonne Strecková, could have envisaged the successful future of the seminar that we are experiencing today. The seminar very quickly became an event that Czech and Slovak experts on public economics, public finance, social policy and related disciplines became used to attending every January. This has always been a venue for inspirational interdisciplinary communication. During our, sometimes quite vehement debates, in which our late friend, Rochdi Goulli, usually excelled, we learnt from one another and together moved the nascent field of studies forward. The subsequent less formal discussions and sing-songs over a glass of wine, that were organized by doc. Rektořík in an unforgettable way and where Mr. Heroudek used to play for us, often stretched into the wee hours of the night. They became famous and in the early years may well have been the main attraction of the seminars. Thanks to them, many long-lasting relationships of collegial cooperation, trust and friendship were established, even though we did not yet call it networking and team building at that time.

This first development phase of the Šlapanice seminars gradually ceased, as everything beautiful does. The time came to prove one's strengths, tick off finished tasks, and write reports on effectiveness and performance. The number of free discussions slightly diminished, while the number of presented contributions increased. We were still successful in finding attractive topics for seminars and continued publishing interesting proceedings. In addition to the traditional participants, young colleagues began to appear. The seminar underwent a few innovations, of which at least one must be mentioned – since 2009, we have begun to invite keynote speakers and have managed to attract top foreign and domestic experts such as H. Anheier, J. Liddle, M. Potůček, J. Nemec and T. Sirovátka to give presentations at our seminar.

The focus on increasing the quality and impact of the published contributions proved to be a key decision for the future of the seminar. The standard double blind procedure started to be applied to reviewing contributions, we switched to English, and the result was the inclusion of the proceedings of the seminar in the Thompson Reuters List. The quality of contributions has literally grown from year to year; the seminar has increasingly acquired an international character. It is also confirmed that the disciplines devoted to the research of the State's economic functions in our country have fully developed and have become standard in terms of the deployed research methods and the level of outputs.

What then is there to be wished for when the successful event celebrates its jubilee? Firstly and also for the future, enough enthusiastic and capable organizers as well as enlightened leaders. It would be nice if colleagues from other countries also developed a habit of attending the seminar in Šlapanice in higher numbers, which would increase its international character and acceptance. And if the commenced trend of increasing its scientific level and the relevance of published contributions is successfully maintained, its future will be well provided for. I am actually sure that the renowned hospitality of the seminar in Šlapanice and its traditionally friendly atmosphere creates an insurmountable competitive advantage that will help it to survive in today's somewhat too utilitarian world.

Ivan Malý

Úvodní slovo

Organizátoři tradičního „šlapanického" semináře mne požádali o sepsání úvodního slova pro tento sborník. Seminář letos slaví dvacáté narozeniny a já prý stál při jeho zrodu. Takže jsem oficiálně prohlášen pamětníkem ve věku ctihodného kmeta Nerudy. Inu, doufám jen, že i pro ně jejich synek, až jim se ruka třásti bude, korýtko udělá.

Když jsme před dvaceti lety začínali do Šlapanic zvát kolegy ze sesterských kateder a ústavů zabývajících se výukou a bádáním v oblasti ekonomie veřejného sektoru, nedokázala si patrně úspěšnou budoucnost semináře, kterou dnes zažíváme, představit ani zakladatelka našeho oboru, legendární profesorka Yvonne Strecková. Seminář se velmi rychle stal místem, na které si v lednu zvykli jezdit čeští a slovenští odborníci zabývající se veřejnou ekonomikou, veřejnými financemi, sociální politikou a příbuznými disciplínami. Docházelo tu vždy k inspirativní interdisciplinární komunikaci. V leckdy urputných debatách, ve kterých zpravidla exceloval náš zesnulý přítel Rochdi Goulli, jsme se učili jeden od druhého a společně posunovali rodící se obor. Navazující méně formální diskuse u vína a písniček, které nezapomenutelným způsobem organizoval doc. Rektořík a hrával nám při nich pan Heroudek, se často protáhly až do pozdních hodin. Staly se pověstnými a v prvních letech možná byly i hlavním lákadlem tehdejších seminářů. Díky nim vznikly mnohé dlouholeté vazby kolegiální spolupráce, důvěry i přátelství, i když jsme tomu tehdy ještě neříkali networking a teambuilding.

Jako všechno krásné i tato první fáze vývoje šlapanického semináře postupně pominula. Nastal čas honu na bobříky, vykazování čárek, efektivnosti a výkonů. Mírně ubylo volných diskusí, zvyšoval se počet prezentovaných příspěvků. Stále se nám dařilo nacházet atraktivní témata seminářů, vydávali jsme zajímavé sborníky. Vedle tradičních účastníků se začali objevovat mladí kolegové. Seminář prošel několika inovacemi, z nichž nutno zmínit alespoň jednu – od roku 2009 jsme začali zvát tzv. hlavní řečníky a dařilo se nám přilákat k vystoupení špičkové zahraniční i domácí odborníky jako byli H. Anheier či J. Liddle, resp. M. Potůček, J.Nemec a T.Sirovátka.

Klíčovým rozhodnutím se pro budoucnost semináře ukázala orientace na zvýšení kvality a impaktu publikovaných příspěvků. Začala se uplatňovat standardní double blind procedura jejich recenzování, přešli jsme na angličtinu a výsledkem bylo zařazení sborníku ze semináře do seznamu Thompson Reuters. Kvalita příspěvků roste doslova rok od roku, seminář dostává ve větší míře mezinárodní charakter. Potvrzuje se, že i samotné obory věnující se u nás zkoumání ekonomických funkcí státu dozrály, staly se standardními co do používaných metod bádání i úrovně výstupů.

Co přát úspěšnému jubilantovi? Předně i do budoucnosti dostatek zapálených a schopných organizátorů a organizátorek jakož i osvícený leadership. Bylo by krásné, kdyby se do Šlapanic naučili jezdit ještě ve větší míře i kolegové z dalších zemí a zvýšil se tak jeho mezinárodní charakter i ohlas. A pokud se podaří udržet nastoupený trend zvyšování vědecké úrovně a relevance publikovaných příspěvků, bude o jeho budoucnost postaráno. Jsem si totiž jistý, že vyhlášená pohostinnost šlapanického semináře a jeho tradičně přátelská atmosféra vytváří nepřekonatelnou konkurenční výhodu, která mu pomůže přežít i v dnešním poněkud příliš utilitárním světě.

Ivan Malý

SESSION I:
PUBLIC ADMINISTRATION
AND PUBLIC SECTOR

Evaluation of User Interface Usability
of Public Administration Webpages by Models

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Abstract

This article presents a not well-known way of usability evaluation and it focuses on user interface evaluation using models. It is another method of evaluating, apart from user and the expert evaluation. This article presents a short review of the existing models and it is focused on usability evaluation. There are seven basic models. Some of them are demanding because of their time requirements; other because of their knowledge demands; or there is a combination of both factors. Based on the models review and comparison, one model was chosen for a statutory cities websites evaluation. Before the model was constructed, there was an existing agreement that one model was to be created - for each city and for each task. There are five chosen statutory towns (Brno, Hradec Králové, Olomouc, Pardubice and Plzen) and five chosen tasks - that means twenty-five models were created in the end. For each model, time of its performance was stated. Thanks to this factor, the statutory city Hradec Králové emerged as the town with the best usability. This result was approved by usage of a supplementary method.

Keywords: usability; models; user interfaces; usability evaluation

JEL Classification: H76, H83

1   Introduction

The paper will deal with usability [18] and its evaluation. At first, it is important to list and clarify a few terms related to usability. Usability engineering is a set of activities which are used during product development, possibly even before a product is designed [18]. In order to evaluate usability, it is suitable to use a few complementing methods, which ensures that what one method omits, another will cover. The term usability represents a characteristic of e.g. web sites which defines the easiness of user interface usage [10]. Usability is based on five quantifiable components: Learnability, Efficiency, Memorability, Errors, Satisfaction. These components cover easiness of learning, using and minimum errors when working with the system, high-efficiency benefit and pleasure from interaction with the system [17].

The best-known methods targeted at usability evaluation of user interface are user testing method and method utilizing knowledge and experience of usability experts –heuristic evaluation method [10]. Another method, less known, is the method of analytical modeling techniques [10]. Thanks to modeling techniques it is possible to create a user model - model of user behavior in a particular environment - and thus avoid subjective viewpoints of experts or time requirements of a project [18]. And these are the usability evaluation options that will be explored in this paper.

Each method of testing and evaluation usability has its advantages and its disadvantages. Usability testing with real users is a basic method of testing as stated in [18]. It is an irreplaceable method which provides direct information about how users work with computers. It is important to clarify the reason of testing - determining correct and wrong aspects of the interface together with interface improvement or evaluation of the overall interface quality [18]. Further, it is necessary to select a corresponding sample of users with the right knowledge, abilities etc. and a place for the testing. The result of heuristic evaluation that involves expert opinions during usability evaluations depends on experts' view and therefore they are burdened with subjectivity. Therefore, it can be problem to find an expert in given

domain. Unlike those methods of usability evaluation models are not time, technically and financially demanding. Unfortunately, the current models are too focused on advanced user interfaces, such as web sites.

Usability testing and evaluation of advanced user interfaces - web sites is aim of interest for several years. It has been developed a number of methods for these purposes [1], as well as a number of heuristic criteria for usability evaluation by the experts [12]. There are also methods that use natural language of an expert in the usability evaluation [8], [9]. At the same time there is an attempt to automate this process of evaluation [3], [11]. However, analytical models in web user interface usability evaluation are not yet very widespread.

The target of the paper is to present the results of a model proposal from the group of analytic modeling techniques which will be used to evaluate usability of statutory cities websites. As per the research, model NGOMSL [13] will be used.

2 Material and Methods

2.1 Natural GOMS Language

Creating of GOMS represents an approach from the stage when methods are described using top-level operators to final replacing these top-level operators by methods which represent fulfilling the particular goal using several operators of a lower level or primitive external operators.

The structure of NGOMSL model [13]:

- creating a list of activities which describe user's approach to achieve the target. The steps should be created on a level which corresponds to the solved level. The models must include principles of key level model, simplifying assumptions, and defined new high-level operators. If there are more methods to achieve the target, it is necessary to create a set of selection criteria for every target.
- Target hierarchy - specific key sequences should not be used earlier than on the fourth level. The problem solving structure goes from the most general target to the most detailed ones.
- Methods - every method should have maximum 5 steps, if it contains more steps, it is most probably not the correct level of detail. In such a situation we need to evaluate whether the steps included in the method could be transformed to a higher level - more general. This is a recommendation at general problem description.
- Number of operators in individual steps; e.g. do not use more than one operator: fulfill target, do not use more than one high-level operator.
- Control, e.g. control of details and length of every method, control of assumptions made on user's expertise, regarding number of operators in a step
- Documentation and analysis control - documentation should include e.g.: procedure steps

There are two options of human behavior prediction in NGOMSL model. One of them is prediction of time which is required to carry out a concrete part of a task using procedures. The other one is the possibility to determine time which a user needs to learn procedures which are used in the NGOMSL model.

The estimation of time requested to carry out a particular part of a task is given by the number and content of the statement which it includes and which must be carried out. It depends on the number of cognitive steps or the number of the selection rules, but also on the times of individual operators. The times of operators represent the time during which an operator is carried out, e.g. pressing a key. Based on the selection rules only one of the IF options can be carried out. It will select that part of the task which is, in our case, simplest for the user.

Time prediction for carrying out a part of a task has these parameters[13]:

- time of NGOMSL statement = number of processed statements X 0.1 seconds,
- time of primitive external operators per [7] = total time,
- time of operators defined by the analyst é total time,
- waiting time = total time that the user is waiting for system response.

Every new defined mental operator was assigned with time of 1.20 seconds, based on [19].

In case of time prediction needed to learn, only net time needed to learn procedures (PMLT) necessary to carry out the task is taken into account. The time of learning of each statement depends on the situation during which the learning is carried out [13]. It may be either a situation of very strictly supervised training or a situation when learning is realized in more realistic conditions.

In case of a realistic situation the user carries out the task using verbal help. Defined learning parameter has a value of 17 seconds [13]. At strictly supervised training which is based on efficiency and feedback from new users, not experts, are taken into account mostly. Defined time of learning has value of 30 seconds. [15]

Net time needed to procedure learning is calculated based on formula [13]:

$$PMLT = number\ of\ NGOMSL\ statements * learning\ parameter \qquad (1)$$

2.2 Multi-criteria Utility Functions with Certainty

In order to verify the results, especially order of the cities in usability rating, a multi-criteria function of utility in certainty was used which enables option evaluation at the same number of (criteria) tasks [6]. Using this method represents an extension to the reached results. Cost and yield criteria are recognized within the multi-criteria utility function [6],

The multi-criteria function of utility works with normalized values, therefore, the records are normalized to interval 0 to 1. This means that at each task the best time is selected and assigned with value 1 and the worst time which is assigned with value 0 [6], other values are calculated. Using the normalized values, criteria weights are calculated based on the impact of options, while worst time, best time are used for calculations as well as the difference between the worst and best time, preference order, un-normalized values (determining change significance). The result of the whole process is normalized weights which, in combination of utilities of the options, provide the total utility of each option. The calculation is represented by the following formula:

$$u(X) = \sum_{i=1}^{n} v_i * u_i(x_i) \qquad (2)$$

where used characters mean:
X   decision option
$u_i(x_i)$ partial utility function with certainty of i-th criterion
x_i result of option with i-th criterion
v_i weight of i-th criterion
n   number of criteria

3   Results and Discussion

3.1 Research of Existing Models

A broad scale of modeling techniques has been developed which support a quantity of various analyses. Modeling methods enable to predict usability with low cost. They are usually used to complement other methods. e.g. user testing [10].

This type of usability testing, unlike user testing, is not burdened with low speed and high cost of usability testing. The methods of user and expert testing are limited by time, cost and user selection.

One of the following models can be used for usability evaluation, however, it needs to be aligned to the solved problem available knowledge, time and finance resource available.

Design Analysis

These are methods which focus mostly on fully representation of user knowledge at all levels of abstraction within the interaction between a person and computer system. Design analysis includes tools: extended grammar of "live task" - ETAG and command language grammar - CLG [10].

Task Environment Analysis

Task environment analysis searches for relation/connection between terms and activities which the user provides to the system and between terms and activities which represent carrying out the task outside the system [16].

Knowledge Analysis

Knowledge analysis uses formal grammar to evaluate and represent knowledge necessary for transformation of specific user tasks to user interface tasks. It includes methods such as: action language - AL and live task analysis - TAG [10]. Methods AL and TAG differ in formal grammars they use.

GOMS Analysis

It is a cognitive model dealing with cooperation human-computer which decomposes the task flow to small parts [14]. Using the GOMS method is the most basic approach in user interface evaluation which is based on models.

Cognitive Task Analysis

Cognitive task analysis constitutes a study dealing with how people think, achieve their goals, organize or structure information. [4] Using cognitive task analysis in interface usability evaluation focused on models is represented especially by using mentioned GOMS models.

Programmable User Models

PUM analysis focuses especially on user knowledge and device status description especially in order to uncover the differences between those. Programmable user models have double value within the human-computer interaction (HCI) [2]: they are able to predict user behavior inside the interface and to evaluate it based on prediction; they are able to make the designer think as a user.

UIDE Analysis

User interface design environment analysis utilizes the application model for automatic interface creation (application model represents application structure description, not the content). [5] UIDE represents GOMS analysis management, it automatically creates prediction models.

3.2 Model Selection

The primary goal was to carry out a research of the models that enable to evaluate usability. The result was mapping of seven methods. The next step was a selection of a suitable model to evaluate web sites usability. Comparing of described method resulted in the conclusion that the most suitable method corresponding to the need of web site usability evaluation is NGOMSL model as a part of the GOMS analysis.

Unlike other models from the GOMS analysis, NGOMSL is a higher-level model, therefore, it enables a higher quality evaluation. It uses number of statements, length of system response and

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time of mental operators defined by the analyst in order to evaluate the usability. Another advantage of NGOMSL lies in use of natural language thanks to which it is possible to avoid errors in interpretation of its records. As well as other GOMS models, also NGOMSL is included into task cognitive analysis - involvement of human cognitive abilities. In comparison to NGOMSL, other models are either to demanding from time, financial or knowledge perspective or do not enable such usability evaluation.

3.3 Model Creation

Before creating the NGOMSL model it was set that web site usability evaluation will be made for sites of five statutory cities on five tasks. The most important for model creation was its ability to correspond to the reality, therefore, NGOMSL creation was preceded by email communication with statutory cities representatives. Several statutory cities were asked, while the direct request was responded by cities: Hradec Kralove, Olomouc and Pardubice. Other cities were included based on panel consensus: Brno and Plzen. Based on provided information, see example in Tab 1, intersections were created and were used to create tasks to be modeled by NGOMSL. Some tasks were created by panel consensus.

Table 1. The most frequent tasks in Pardubice

Most frequently searched words	Corresponding pages
• office	• http://www.pardubice.eu/urad/
• city hall	• http://www.pardubice.eu/urad/radnice/
• contacts	• http://www.pardubice.eu/kontakty/
• online reservation	• http://www.pardubice.eu/urad/radnice/on-line-rezervace/
• koník (note: konik is a guide through life situations and responsible offices)	• http://www.pardubice.eu/urad/konik/
• prepared documents	• http://www.pardubice.eu/urad/radnice/odbory-magistratu/odbor-spravnich-agend/zhotovene-doklady/
• city districts	• http://www.pardubice.eu/urad/mestske-obvody/
• job vacancies	• http://www.pardubice.eu/urad/radnice/volna-mista/
• driving licenses	• http://www.pardubice.eu/urad/radnice/odbory-magistratu/odbor-spravnich-agend/zhotovene-doklady/ridicske-prukazy/
• citizen ID cards	

Source: Authors

Selected tasks are:
- Task 1 - find opening hours of department dealing with flat sales and management
- Task 2 - find job vacancies
- Task 3 - (online reservation) - request for a new ID card
- Task 4 - find information about collecting finished driving license
- Task 5 - find information from what dog age (in months) dogs must be paid for

For each of these 5 statutory cities, a NGOMSL model was written for each task. Therefore, 25 models were created. The following example represents task 1 in Pardubice - show "Opening hours of the department of property and investments". This is a 4th level within hierarchical decomposition of the task in NGOMSL where it is possible to use also so called keyboard operators which have timings defined in advance.

Method for Sub-goal - Select the Key Word

Method for goal: Select 1 key word
Step 1. Determine starting position for 1 key word.
Step 2. Decide: If hand is not on the mouse, move hand on the mouse. (0.40 s)
Step 3. Move the cursor to the beginning of 1 key word (1.10 s)
Step 4. Click the mouse button (1.10 s)
Step 5. Return with accomplished task

The method contains several operators - mental operator, keyboard operator, also statement - return with accomplished task.

3.4 Estimate of Time Necessary to Complete a Task

The total times for completing a task were determined for every statutory city and all timings with the use of already stated formulas. Only the system response time was defined by manual completing the task of the part of the model by an analyst whose activity was recorder by software Camtasia Studio 8. The final timings are recorded in Table 2.

Table 2. Timings of task duration

Time to complete task [s]	Pardubice	Hradec Kralove	Olomouc	Brno	Plzen
Task 2 - Job vacancies	20.30	13.00	12.40	7.30	9.00
Task 5 - Dog age	56.40	17.70	25.60	66.60	1000.00
Task 4 - Driving license	24.80	19.80	24.60	21.10	44.50
Task 3 - Online registration	21.10	18.80	20.10	20.50	25.20
Task 1 - City department	37.90	26.60	19.60	26.90	15.70
Total time	160.50	95.90	102.30	142.40	1094.40

Source: Authors

The evaluation of web site usability of statutory cities: Brno, Hradec Kralove, Olomouc, Pardubice and Plzen using the NGOMSL models resulted in the best evaluation for Hradec Kralove.

3.5 NGOMSL Results Verification

In order to verify the results obtained using NGOMSL model, a multi-criteria function of utility in certainty was selected as the complementing method. Normalized weights are the same at all tasks due to the same level of preference among tasks. The result is almost the same as the order of total times in the NGOMSL model.

Table 3. Overall valuation of options

Task	Normalized Weight	Pardubice	Hradec Kralove	Olomouc	Brno	Plzen
Job vacancies	0.20	0.00	0.75	0.25	1.00	0.50
Dog age	0.20	0.50	1.00	0.75	0.25	0.00
Driving license	0.20	0.25	1.00	0.75	0.50	0.00
Online reservation	0.20	0.50	1.00	0.25	0.75	0.00
City department	0.20	0.00	0.50	1.00	0.25	0.75
Total utility		0.25	0.85	0.60	0.55	0.25
Order		4	1	2	3	4

Source: Authors

3.6 Estimate of Time Needed to Learn Tasks

In order to find out the difficulty to learn the procedures included in NGOMSL model the methods of realistic situation was used. The total time estimate of time needed to least procedures in the NGOMSL model represents a multiplication of the total number task statements at one statutory city and value of 17 seconds. The most easily learnable seem to be statutory city Hradec Kralove. It uses less statement than other statutory cities.

Table 4. Time needed to learn procedures

Time to learn task [s]	Pardubice	Hradec Králové	Olomouc	Brno	Plzeň
Total time	2584	2397	2431	2465	19261

Source: Authors

4 Conclusion

The article has presented methods focused on evaluation of usability using models which approach usability evaluation very differently in comparison to user and expert testing. All models that are included in this category were mapped in the research phase; in total it is seven best-known models. In order to verify the ability of models to evaluate usability of statutory cities websites, model NGOMSL was selected and consequently designed. Information obtained based on cooperation with some statutory cities was used to design the model. The NGOMSL record included 25 models for five statutory cities, with five tasks for each. Prediction of human behavior was carried out for each of the 25 models, in other words, times needed to carry out tasks were calculated. The best time of task completion was achieved for statutory city Hradec Kralove, which achieved the shortest time in comparison to other cities. The final order was confirmed also by a multi-criteria function of utility, which differed only in placing Pardubice and Plzen on the same level of website usability.

Based on the results it is possible to use the models for usability evaluation; provided an appropriate model is selected, it is a desirable method of evaluation which is cleared from negative influence of the currently widely spread methods.

On the contrary with usability testing with real users and heuristic evaluation that uses experts' opinions the suggested method by help of model is not time, technically, personally and financially demanding. The important advantage of the suggested method is a fact that it is not is not too burdened with subjectivity.

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Small and Medium Size Enterprises in the Municipality Public Procurement and Municipal Companies. Case Study of the Czech Republic

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Abstract

The paper explores the relationship between procurement and implementation SMEs with the municipality aspect. This article highlights the fact that the new policy within the EU is to support SMEs in public procurement. The article deals with some spatial relations of public contracts in the Czech Republic. Focus is on public contracts awarded statutory cities of the Czech Republic and its municipal companies. The article points out that there is a strong share of public contracts awarded to SMEs in public contracts awarded statutory towns in the Czech Republic and municipal companies and also points out that a high proportion of financial allocation of public procurement is carried out in the relevant statutory city.

1   Introduction

This article deals with the relationship between public contracts and possibility of winning small and medium size enterprises in the selected municipalities. Small and medium size enterprises are subjects of research form more points of view. For example Cooke, Piccaluga,, [2] states that within preferences SME leaders debate how these companies 'favour' or 'give preferential treatment' in public procurement, it is clear that the implementation of public procurement by local businesses, which mostly includes small and medium-sized enterprises, affecting the development of the region and the city Kutscherauer [10] gives opinion that this also leads to removing regional disparities. Within the advantage of SMEs were discussed in particular the legislative tools to encourage that discussions were in the realm of direct benefits through its share of compulsory public procurement (the American way) or indirect advantage, that is the settings of the system of public procurement, that its concept does not discriminate against SMEs, which was considered as a suitable way that is not inconsistent with the EU's internal market and EU international commitments [7]. Above led to the adoption of new procurement directives (Directive of the European Parliament and Council Directive no. 2014/24 / EU), which in relation to SMEs contains the following provisions, see more in [3]. Support of SMEs can have an impact on wages and employment in the Czech economy. Support of SMEs can have an impact on wages and employment in the Czech economy [4]. Difficult conditions for obtaining public contracts discouraging SMEs from participating in them and more expensive public procurement [14]. Overpriced public contracts may be considered under certain circumstances considered contrary to the rules of public support [16], [8].

Many suppliers and enterprises, and especially SMEs, find that a major obstacle to their participation in public procurement consists in administrative burdens deriving from the fact that they must produce a substantial number of certificates or other documents related to exclusion qualification criteria and selection. Limiting such requirements, for example through the use of a single European certificate for public contracts consisting of the updated its own statement, could lead to significant simplification for the benefit of both contracting authorities and economic operators.

Limitations central procurement, arguing that the markets of the EU public procurement appears strong trend towards aggregation of demand by public purchasers, with a view to achieving economies of scale, including lower prices and transaction costs, and improving and professionalising procurement management. This can be achieved by concentrating purchases either by the number of participating contracting authorities or by continuous volume and value. However, aggregation and centralization of purchases should be carefully monitored to avoid excessive concentration of purchasing power and unfair competition, and to preserve transparency and competition, as well as opportunities for small and medium-sized enterprises regarding their access to the market.

Kim, et al. [9] in their study point out that small and medium size enterprise-friendly policies are central to public procurement. The extent to which these policies have been put into practice has gone largely untested. Policy implementation was found to be limited.

According to Andersch, Montague, Buehlmann, et al. [1] small- and medium-sized enterprise has specific role. It was examination in the concrete field. The outputs of this study shows that large sawmills tend to rely more on gatewood from loggers and stumpage harvested by company contract loggers than do small- and medium-size sawmills. U.S. harwood sawmill log procurement practises are evolving in some cases direct support of local SMEs.

Fera, Iannone, Macciaroli, et al. [5] and Flynn, Davis [6] says that there good experience to doing business by SMEs because of good influence on taxation, local employment and good cooperation with local authorities. Witczak, Kasprzak, Klos, et al. [21] on example of Poland examine important role of SMEs on innovation and new trend of providing business with the impact on social and green aspects.

Role of SMEs in the economy, is irreplaceable, as well as in public procurement. The public sector cannot combine factually unrelated contracts with the fact that in order to improve opportunities for SMEs to participate in large-scale dynamic purchasing systems, such as those, which operates a central authority should issue a public authority to be able to divide the system to objectively defined categories of products, works or services. These categories should be defined based on objective factors, which may include, for example, the maximum allowable range of the individual contracts to be entered in that category, or a particular geographical area in which the individual procurement will be carried out subsequently. If a dynamic purchasing system is divided into categories, the contracting authority should apply the criteria for the selection of appropriate properties of the respective category.

This article discusses the situation in the Czech Republic in cities and urban businesses in the Czech Republic and deals with the current situation.

2 Material and Methods

This paper deals with SMEs and their importance in public contracts awarded by chartered cities as major public procurers in the Czech Republic. They examined the tools to support small and medium-sized enterprises within the legislative developments which highlight the new procurement directive, whose principal purpose is the promotion of SMEs. Furthermore, they are examined contracts awarded by chartered cities defined in the Law on Municipalities. It examined a set number of public contracts, and what proportion of their assignment, small and medium-sized enterprises. It also deals with a financial allocation of public funds in the statutory cities and share the winning contractors, who are based in the statutory city. In addressing the research questions, how many contracts won SMEs in public procurement contracts awarded by the relevant statutory town and what was the dollar amount (research question no. 1) and what is the share of public contracts acquired in the statutory city SMEs to the total volume of public procurement and whether the winning suppliers have a statutory seat in the city, under which succeeded in a tender (research question no. 2) was used Public Procurement Bulletin (Věstník veřejných zakázek, VVZ, [19]), the operation of the Ministry for Regional Development. From this source, information was obtained on public

contracts to the state as of January 2015. With the use of this resource, information was obtained on a total of 6956 public procurement. Table. 1 shows the attributes necessary to answer the above research questions.

Table 1. An overview of the parameters of the Journal of Public Procurement

Attribute	Characteristic
Name	Name of public contract (source IS PC)
Price of contract	Price of public contracts in CZK (source IS PC)
Supplier	The name of the vendor (source IS VZ)
	City headquarters vendor (source commercial database Albertina)
	Features vendor (in terms of SME ?, source of commercial database Albertina)
	Seat suppliers due to the definition of regions with concentrated state support
Contracting authority	City of sponsor's seat (source commercial database Albertina)

Source: Author based on VVZ [19]

For completeness is fitting to note that small and medium-sized enterprises (SMEs), according to European regulations defined as enterprises with fewer than 250 employees and a turnover of less than 50 million Euros. It defines for examples Záboj, Vajčnerová, Peprný [22]. Wagneová, Šebestová [20] say that because it consists of a total of 90% of businesses in the EU and their contribution to job creation and employment is greater than 75% are considered as the backbone of regional and European economies and employing these companies have earned a special status within the framework of European policies and also public procurement. Within the framework of the Single European Act declared that they intended to enable access of SMEs to public procurement, since their economic activity is beneficial in regional and global concept. In the Czech Republic were selected to examine public procurement of statutory towns, as Statutory cities are an important element of the regional structure of the Czech Republic [11].

3   Results and Discussion

Within the public sector organizations play an important role in the towns and selected cities. The municipality has a long tradition. Out of about 6300 municipalities and 602 cities have 25 statutory municipalities. According to § 4 of the Act no. 128/2000 Coll., on municipalities, as amended, chartered statutory cities are Kladno, Czech Budejovice, Plzen, Karlovy Vary, Usti nad Labem, Liberec, Jablonec nad Nisou, Hradec Kralove, Pardubice, Jihlava, Brno, Zlin, Olomouc, Prerov, Chomutov, Decin, Frydek-Mistek, Ostrava, Opava, Havirov, Most, Teplice, Karvina, Mlada Boleslav and Prostejov.

The number of contracts completed by SMEs in individual statutory cities and their total financial allocation

Table 2 shows the number of contracts examined, which won SMEs in individual statutory cities and what was their financial value. Although the assessment does not provide a comprehensive picture about the relationship between public contracts awarded by chartered cities and small and medium enterprises in terms of regional development in terms of data useful in answering the first research question, referred to above.

Table no. 2 shows that there is a high and a significant proportion of SMEs to public contracts awarded in individual municipalities. From this perspective, it is possible to infer that public contracts are an important tool for the development of a statutory town and also that a significant proportion of small and medium-sized enterprises in the regional economy of the statutory cities with significant financial allocations.

The share of SMEs in all public procurement of statutory cities included in the Bulletin of Public Procurement [19] contains a table no. 3, which also contains information about whether

the small and medium enterprise, has been assigned a public contract, is based on the statutory city.

Table 2. The number of contracts obtained by SMEs in individual statutory cities and the total financial allocation of public contracts, the towns in the role of the contracting authority; without capital city of Prague; IS VZ state to January 2015

City and municipalities companies in cities	Numbers of public contracts	Whole financial allocation in billions CZK
Kladno	51	7,3
České Budějovice	71	5,1
Plzeň	175	2,5
Karlovy Vary	62	7,3
Ústí nad Labem	125	2,5
Liberec	105	8,6
Jablonec nad Nisou	75	9,9
Hradec Králové	98	7,2
Pardubice	76	8,2
Jihlava	74	7,5
Brno	363	16,2
Zlín	234	11,2
Olomouc	334	7,6
Přerov	97	6,2
Chomutov	88	4,5
Děčín	66	4,4
Frýdek-Místek	78	5,1
Ostrava	301	13,3
Opava	96	7,6
Havířov	109	9,4
Most	105	9,6
Teplice	93	6,4
Karviná	63	3,5
Mladá Boleslav	77	5,6
Prostějov	54	6,2

Source: Author based on VVZ [19]

Table no. 3 shows that there are a high proportion of suppliers winning public contracts awarded by statutory cities. It is a fairly share of 86-95%, which is a high proportion of small and medium-sized enterprises within the sub-limit and over-limit public contracts awarded by chartered cities and the terms of the share which exceeds the share of SMEs in public procurement in the European Union, for example in excess public contracts in the Czech Republic [8].

This may be explained by the fact that public procurement often participating suppliers, whose principal business is business, "reselling" and thus for example public procurement of computers and license Microsoft Office supply small and medium-sized enterprises, although this is a product of large multinationals company.

Table no. 3 also implies that all statutory towns the vast majority of public contracts awarded to small and medium-sized enterprise based in the statutory city. It is a closeness financial allocations of all statutory towns, with the vast majority of them play an important role among SMEs based in the statutory city.

Table 3. Shares of public contracts awarded in statutory cities, SMEs and considerationseat suppliers (without the City of Prague); IS VZ status for January 2015

City and municipalities companies in cities	The number of suppliers for SMEs, who are based in the statutory city, which won a public contract	The number of suppliers who have obtained a contract and are SMEs
Kladno	58 %	91 %
České Budějovice	52 %	89 %
Plzeň	64 %	94 %
Karlovy Vary	67 %	89 %
Ústí nad Labem	53 %	91 %
Liberec	53 %	90 %
Jablonec nad Nisou	74 %	92 %
Hradec Králové	54 %	91 %
Pardubice	56 %	89 %
Jihlava	63 %	95 %
Brno	71 %	93 %
Zlín	76 %	95 %
Olomouc	60 %	90 %
Přerov	62 %	89 %
Chomutov	66 %	88 %
Děčín	62 %	93 %
Frýdek-Místek	63 %	91 %
Ostrava	64 %	90 %
Opava	60 %	87 %
Havířov	59 %	89 %
Most	62 %	93 %
Teplice	64 %	90 %
Karviná	66 %	90 %
Mladá Boleslav	60 %	88 %
Prostějov	58 %	86 %

Source: Author based on VVZ [19]

4 Conclusion

To strengthen the role of SMEs in the EU, it can be said that their role in the Czech Republic in the procurement of statutory towns is significant, given the fact that these suppliers offered mostly manufactured goods or provide services. It can therefore be concluded that there is a direct relationship between the city and the towns of suppliers, which are obtained public contracts.

If numerically summarize the results of this study can be concluded that the 23 largest cities for the fixed period examined commissioned a public contract worth more than 121 billion Czech crowns. It was more than 100 bellow-threshold and above-threshold public contracts with a share of 86-95% of SMEs as the winners of these public contracts. For that 52-76% were placed in the city of award that public contract.

In this context it is also fitting to point out that the regional structure is important not only share of SMEs in public procurement [13], [15] and regional policy [18]. Within these you can set social, environmental and regional aspects of that policy, as well as promote social and economic development of communities and regions [12]. In this respect it can be recommended to lead discussions on deepening cooperation in tackling local unemployment and deeper development of small and medium-sized enterprises [17]. Above should be more concerned with statutory cities.

The limitation of this study is that more winners of public contracts are SMEs that are owned by multinational corporations. Is some cases, the role of SMEs as well as shows the example above, Microsoft's role in some cases Reseller Products sized companies and benefit companies such as SMEs is debatable.

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Risk-Taking Attitudes and Lottery Experiment

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Abstract

We carry out framed lottery game experiments with the aim to study whether economic agents behave in accordance with expected utility theory. We control for socioeconomic background of the participants and we use Domain-Specific Risk-Taking (DoSpeRT) scale to detect, which of the five risk domains (ETHICAL, FINANCIAL, HEALTH, RECREATIONAL, SOCIAL) have most impact on risky behavior in a lottery game. We find out, that females are more rational than males in non-risky environment and males are more rational in a risky environment. Also, the evidence of more frequent use of risky strategy by males is found. We also document the fact, that in lottery games, groups behave more risky than individuals. An econometric model for prediction of the lottery game results depending on the risk characteristics identified within DoSpeRT is presented in the paper. Our finding suggests that risk seeking behavior in the domain of ETHICS and SOCIAL determines risk taking strategies in lottery experiment.

1 Introduction

The decision making of economic agents under uncertainty and in risky settings has been a subject of many studies. It can be said that any decision of man is somewhat uncertain, so risky. The possible way to study the behavior of humans in ambiguity are economics experiments, because they allow us to observe the decision making process in a previously defined conditions. This article maps out the decisions of economic agents in lottery experiment.

Lottery experiments are based on expected utility theory formulated by von Neumann and Morgenstern [17]. Lately, Kahnemann and Tversky [9] showed that humans do not behave under the expected utility theory and markedly deviate from perfect rationality. Bone, Hey and Suckling [2] also brought evidence of systematic violations of expected utility theory axioms for individuals' treatments and group treatments. Accordingly, Rockembach, Sadrieh and Mathauschek [12] pointed out laxity of expected utility theory and proved that compared to individuals, teams accumulate significantly more expected value at a significantly lower total risk in a lottery game. In their seminal paper, Holt and Laury [8] introduced Holt–Laury measure of risk aversion by using multiple price list method. This experiment is widely used as benchmark for numbers of experiments. Spalek and Berna [15] examined the effectiveness of various charitable lottery structures and differences in behavior caused by participants´ nationality. Baker, Laury and Williams [1] compared risk preferences revealed by three-person groups versus isolated individuals and show the count of safe lotteries chosen by groups is, on average, significantly greater than the mean of the individual members. On the other hand, Vasilkova et al. [16] referred that in lottery game groups behave more risky than individuals in general and that females behave more cautiously than males in individual treatments. Shupp and Williams [14] found that groups exhibited a lower risk aversion than individuals, but only in lotteries with a high probability of winning. Groups' aversion to risk increased with the decreasing probability of winning.

Levin, Snyder and Chapman [10] showed that males invest more and behave more risky than females in betting lottery. Hinz, McCarthy and Turner [7] reached similar conclusions concerning risky behavior of males by analyzing Thrift Saving Plan data in the United States.

Brining [3] showed that the gender difference in risk acceptance is ambiguous and age dependent. Schubert et al. [13] reached the conclusions that females are more risk averse in case of winning lotteries, while if playing the loss lotteries, the females act more risky than men. Gysler, Kruse and Schubert [6] refer to the fact that inexperienced females are highly risk averse, but with increasing experience their risk aversion decreases. Their male sample demonstrated an inverse behavioral pattern.

To determine, what is in the background of decision-making and risk taking behavior in lottery experiments, economists use Domain-Specific Risk Taking (DoSpeRT) scale (see Appendix) [18]. This non-incentivized method is used mostly by psychologists. In DoSpeRT questionnaire, five different risky domains (Social, Recreational, Financial, Health, Ethical) are present and participants are asked how likely are they to engage in these activities on a scale from 1 (Extremely Unlikely) to 7 (Extremely Likely). For every domain, six activities are present. Likewise, it is possible to calculate the sum across five domains. The higher the sum is, the more risk seeking the individual is.

Reynaud and Couture [11] showed that risk preference measures are affected by the type of mechanism used in the experiment. Moreover, using DoSpeRT 30 item questionnaire, the authors demonstrated that risk preferences of economic agents are context-dependent. The authors consider these context-dependent risk preferences as an explanation of the observed risk preference instability. Gazda et al. [5] verified whether decisions of the experiment´s participants differ when dealing with positive and negative payoffs in a lottery game. Standardized scale (DoSpeRT) evaluating the participant willingness to take risks in different domains of life is also considered. The authors identified that decision-making process in lottery experiment is based on domains of Ethics, Finance and Social decisions. For more information, see Charness, Greezy and Imas [4] where the overview of prevailing methods for eliciting risk preferences is proposed and the advantages and disadvantages of each are outlined.

Paper is organized as follows: Materials and Methods are presented in the second part, and then Experimental design is described. Fourth part presents the basic results of experiment. The fifth part is devoted to Regression analysis and final part of the paper briefly encloses our findings.

2 Material and Methods

Experiment presented in this paper was only the one part of complex experiment which was conducted with the aim to better understand the decision making process of economic agents thanks to data obtained in various experimental designs. We run Dictator Game, Lottery Experiment, Discount Rate Experiment and Voluntary Contribution Experiment with every participant of the experiment. Moreover, we run every of mentioned experiments with individuals and with groups of three. Groups were created by random drawing.

After finishing the experiment, participants were asked to complete a questionnaire, which consisted of sociodemographic part and DoSpeRT part. As defined above, DoSpeRT questionnaire is widely used to determine risk attitudes of individuals. Everything was run in anonymous conditions. At the beginning of the experiment, subjects received stickers with EAN codes. Subjects were asked to stick these EAN codes on their envelope and on every paper they are at the disposal, thus no personal information were needed and every answer and decision of participant could be matched with other answers, decisions, questionnaire, etc. Everything was run on paper form, mainly because of the fact, that this experiment was run with more than 4000 individuals, among which the majority were persons with low computer literacy, thus paper form was much more appropriate and useful.

To conclude, at the beginning of the experiment, individuals received pens, envelops with instructions, playing cards and EAN codes. After reading instruction, every question about vagueness was answered aloud and experiment started. After finishing the experiment, participants were asked to complete a questionnaire and to hand over the envelope. Participants

were paid few minutes after the experiment finished. They were paid after showing their EAN code, which was paired with their decision list.

Experiment presented in this paper was run on November 2014. Participants were students of economic faculties in Eastern Slovakia. In total, 260 individuals participated in the experiment. Sessions were conducted by trained supervisors. In every session from 15 to 24 individuals participated. Payoff of participants consisted of fixed show up fee and variable component which was determined by behavior during the experiment. Participants earned approximately 10 € per capita. To remind you, this paper presents only the results of Lottery Experiment with university students.

2.1 Experimental Design

Every participant received following playing card, with the following instructions: *You can choose one of two options in every row. This choice has to be done for every out of 10 rows. The first possibility (SAFETY) is the certain guaranteed amount, which increases with every row as shown on the playing card. The second option (LOTTERY) is possibility to play the lottery as shown on the playing card. If you choose to play lottery, one ball out of two will be drawn from opaque bag. Once the ball with sticker ⑮ is drawn, you receive 15 EURO, but when the ball with sticker ⓪ is drawn, you receive nothing. This lottery drawing will be preceded by a drawing which determines the row, upon which you will be paid. Again, one ball from opaque bag, where ten balls with stickers ① to ⑩ are, will be drawn. The number of ball drawn defines the pay row.*

Figure 1. Lottery Game – playing card

Source: Authors

3 Results and Discussion

According to expected utility theory, rationally minded economic agent is able to calculate expected outcomes by knowing the possibility of occurrence of event. Payoffs in SURETY column occur with possibility p=1, thus calculus of payoff is: PROPOSED AMOUNT times 1. Payoffs in LOTTERY column occur with possibility p=0, 5, because there is a 50 % likelihood that ball with sticker ⓪ will be drawn and 50% likelihood that ball with sticker ⑮ will be drawn, thus calculus of payoff in LOTTERY column is: PROPOSED AMOUNT times 0,5 + PROPOSED AMOUNT times 0. All proposed possibilities of payoffs are presented in Table 1. Rational choices are in Table 1 marked by gray color.

Table 1. Expected outcomes

Number of row	SURETY	LOTTERY
❶	1*5=5 €	0,5*15+0,5*0=7,5 €
❷	1*6=6 €	0,5*15+0,5*0=7,5 €
❸	1*7=7 €	0,5*15+0,5*0=7,5 €
❹	1*8=8 €	0,5*15+0,5*0=7,5 €
❺	1*9=9 €	0,5*15+0,5*0=7,5 €
❻	1*10=10 €	0,5*15+0,5*0=7,5 €
❼	1*11=11 €	0,5*15+0,5*0=7,5 €
❽	1*12=12 €	0,5*15+0,5*0=7,5 €
❾	1*13=13 €	0,5*15+0,5*0=7,5 €
❿	1*14=14 €	0,5*15+0,5*0=7,5 €

Source: Authors

Based on the above, rational economic agent should chose in lines ❶-❸ LOTTERY and in all remaining lines ❹-❿ SURETY. In Table 2, overall choices, choices separated by gender, and groups' choices are presented in percentage.

Table 2. Distinctive choices in %

Number of row	SURETY				LOTTERY			
	Overall	Females	Males	Groups	Overall	Females	Males	Groups
❶	26	31	17	13	74	69	83	87
❷	30	35	22	17	70	65	78	83
❸	41	47	32	27	59	53	68	73
❹	69	73	63	56	31	27	37	44
❺	85	86	82	87	15	14	18	23
❻	93	93	93	94	7	7	7	6
❼	91	89	95	97	9	11	5	3
❽	94	94	95	97	6	6	5	3
❾	93	94	92	97	7	6	8	3
❿	94	94	94	98	6	6	6	2

Source: Authors

Simple eyeballing of the Table 2 sketches some behavioral patterns. As expected, none of considered group behaved in a strictly rational way. Only 71 out of 260 participants chose LOTTERY in lines ❶-❸ and SURETY in lines ❹-❿, what indicate, that barely 27% behave in a rational way, thus according to expected utility theory. According to percentage counts, we can state some preliminary conclusions. Firstly, it seems that females behave more rationally in non-risky environment than males, thus choose SURETY more often in lines ❹-❿ in cases when it is appropriate. On the other hand, males are more rational in a risky environment, thus choose LOTTERY more often in lines ❶-❸. It seems that females prevent the risk by abandoning rational strategies in favor of certain profit. Table 2 also suggests that groups' behavior is more risky than the behavior of individuals in cases, when the difference in payoffs is not sharp (lines ❹ and ❺) and more rational in cases, when the difference in payoffs is significant (lines ❻ - ❿).

3.1 Regression Analysis

In this chapter, we present results of linear and logistic regressions. Only 251 observations entered analysis, because of some omitted data. We considered following econometric models of dependence of RISKY CHOICES in a lottery experiment on DoSpeRT domains which are defined by SOCIAL, HEALTH, FINANCIAL, RECREATIONAL and ETHICS factors:

$$RISKY\ CHOICE_i = \beta_0 + \beta_1 SOCIAL_i + \beta_2 HEALTH_i + \beta_3 FINANCIAL_i + \beta_4 RECREATIONAL_i + \\ + \beta_5 ETHICS_i + \mu_i$$

OLS Model 1

Firstly, we tried to reveal, which of the DoSpeRT particular factors determine risky behavior in lines ❹-❿ (risky behavior in lines ❶-❸ are not subject of this study, because this is area of rational strategy). We considered whole sample, thus also non risky strategies in the lines ❹-❿. The resultant OLS model is:

Table 3. OLS Model 1

	Coefficient	Std. Error	t-ratio	p-value	
SOCIAL	0,0182437	0,00909645	2,0056	0,04598	**
RECREATIONAL	0,0121728	0,0104558	1,1642	0,24545	
Mean dependent var	0,784861		S.D. dependent var	1,362912	
Sum squared resid	460,3951		S.E. of regression	1,359771	
R-squared	0,256228		Adjusted R-squared	0,253241	
F(2, 249)	42,88990		P-value(F)	9,87e-17	
Log-likelihood	−432,2859		Akaike criterion	868,5718	
Schwarz criterion	875,6227		Hannan-Quinn	871,4093	

Model 1: OLS, using observations 1-251
Dependent variable: RISKYCHOICE

Source: Authors

Table 3 indicates that OLS Model 1 describes only 25% of the total variance, and only one factor is statistically significant. OLS Model 1 points out, that higher score in SOCIAL domains in real life situations slightly affects behavior in lottery game towards risky one. Further, we tried to find models, which describes risky conduct in a better way, thus we run Multinomial logit.

Multinomial Logit

Multinomial logit was run with aim to determine, which domains of DoSpeRT scale affect the precise number of risky bets in lottery experiment. The multinomial logit outcome is in Table 4.

Table 4. Multinomial logit

	Coefficient	Std. Error	z	p-value	
RISKY CHOICE=1					
const	−0,103678	1,30052	-0,0797	0,93646	
SOCIAL	−0,0509559	0,0402211	-1,2669	0,20519	
HEALTH	−0,00686776	0,040082	-0,1713	0,86395	
FINANCIAL	0,00752719	0,0357044	0,2108	0,83303	
RECREATIONAL	0,0281926	0,025495	1,1058	0,26881	
ETHICS	−0,0446875	0,0463946	-0,9632	0,33544	
RISKY CHOICE=2					
const	−3,58177	1,39102	-2,5749	0,01003	**
SOCIAL	0,0309636	0,044292	0,6991	0,48450	
HEALTH	−0,0161128	0,0424829	-0,3793	0,70448	

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FINANCIAL	0,0143667	0,0361835	0,3971	0,69133	
RECREATIONAL	0,0328459	0,028192	1,1651	0,24399	
ETHICS	0,0248971	0,0461649	0,5393	0,58967	
RISKY CHOICE=3					
const	−1,58133	2,70323	-0,5850	0,55856	
SOCIAL	−0,00482525	0,09137	-0,0528	0,95788	
HEALTH	−0,134807	0,0911881	-1,4783	0,13932	
FINANCIAL	−0,0267136	0,0765889	-0,3488	0,72725	
RECREATIONAL	0,0155168	0,0539008	0,2879	0,77344	
ETHICS	0,101135	0,0947607	1,0673	0,28585	
RISKY CHOICE=4	−5,54808	3,05584	-1,8156	0,06944	*
const					
SOCIAL	0,182038	0,0992567	1,8340	0,06665	*
HEALTH	−0,0391902	0,0883742	-0,4435	0,65743	
FINANCIAL	−0,151139	0,0891698	-1,6950	0,09008	*
RECREATIONAL	−0,00458527	0,0570116	-0,0804	0,93590	
ETHICS	0,0439601	0,0934243	0,4705	0,63797	
RISKY CHOICE=5					
const	−6,38754	3,02239	-2,1134	0,03457	**
SOCIAL	0,0863216	0,0999349	0,8638	0,38771	
HEALTH	0,00735235	0,0900471	0,0817	0,93493	
FINANCIAL	−0,0680657	0,0812716	-0,8375	0,40231	
RECREATIONAL	0,00950142	0,0605484	0,1569	0,87531	
ETHICS	0,0936787	0,0945938	0,9903	0,32201	
RISKY CHOICE=6					
const	−466,37	401464	-0,0012	0,99907	
SOCIAL	−5,70009	5171,57	-0,0011	0,99912	
HEALTH	3,6922	9585,28	0,0004	0,99969	
FINANCIAL	6,80774	8506,99	0,0008	0,99936	
RECREATIONAL	6,72442	6147,6	0,0011	0,99913	
ETHICS	2,93572	14649,7	0,0002	0,99984	
RISKY CHOICE=7					
const	−1,32394	5,65007	-0,2343	0,81473	
SOCIAL	−0,0284533	0,179258	-0,1587	0,87388	
HEALTH	−0,224597	0,189419	-1,1857	0,23573	
FINANCIAL	−0,0909788	0,134359	-0,6771	0,49832	
RECREATIONAL	0,140547	0,104602	1,3436	0,17906	
ETHICS	0,0238414	0,179109	0,1331	0,89411	

Mean dependent var	0,784861	S.D. dependent var	1,362912
Log-likelihood	−275,6816	Akaike criterion	635,3632
Schwarz criterion	783,4322	Hannan-Quinn	694,9499

Model 2: Multinomial Logit, using observations 1-251
Dependent variable: RISKYCHOICE   Number of cases 'correctly predicted' = 162 (64,5%)

Source: Authors

Multinomial logit regression reveals only one verdict: increasing score in SOCIAL domains in DoSpeRT scale increases the chance of occurrence of four risky bets in lottery game and increase in score in FINANCIAL domain in DoSpeRT scale decrease the chance of four risky bets in lottery game while holding all other variables in the model constant. SOCIAL domain seems to play crucial role in risk-taking strategies in a lottery game. Given the low explanatory power of DoSpeRT scale in case of lottery game, we decided to run another OLS Model with dataset, where only individuals, who have risked at least once in lines ❹-❿, were present.

OLS Model 2

In OLS Model 2 we did not consider whole sample, but only individuals, which have risked at least once in lines ❹-❿. The final OLS Model 2 is presented in Table 5. OLS Model 2 retain 69% of total variability, thus we consider it as an adequate model to describe risky behavior in lottery experiment. Coefficients tell us, that risk seeking persons in the domain of SOCIAL and ETHICS in real life situations seek risk also in a lottery game.

Table 5. OLS Model 2

	Coefficient	Std. Error	t-ratio	p-value	
SOCIAL	0,0670289	0,0202735	3,3062	0,00138	***
FINANCIAL	−0,0250182	0,0256045	-0,9771	0,33123	
ETHICS	0,0509955	0,0303222	1,6818	0,09620	*
Mean dependent var	2,188889		S.D. dependent var	1,452580	
Sum squared resid	182,4002		S.E. of regression	1,447948	
R-squared	0,705331		Adjusted R-squared	0,698557	
F(3, 87)	69,41546		P-value(F)	5,22e-23	
Log-likelihood	−159,4922		Akaike criterion	324,9843	
Schwarz criterion	332,4838		Hannan-Quinn	328,0086	

Model 3: OLS, using observations 1-90
Dependent variable: RISKYCHOICE

Source: Authors

4 Conclusion

Lottery game experiments are widely used to map risk seeking behavior/risk avoiding behavior. This study brings some insight on the background of the decision making process in lottery experiments. We find out that SOCIAL and ETHICS factors are on the background of risky tips in lottery experiment. Further, according to our findings, it appears that females behave in a more rational way in non-risky environment than males. It differs from risky setting, where males seem to be more rational than females. According to our data, males risk more than females. This outcome is in line with the conclusions of Brining [3], Levin, Snyder and Chapman [10], Vasilkova et al. [16]. We also document actuality concerning team behavior. It seems that groups' behavior is more rational than the behavior of individuals in cases, when the difference in payoffs are wide. But, groups behave more risky in cases, where the difference in payoffs are not significant. This finding is not in line with Baker, Laury and Williams [1] who find that count of safe lotteries chosen by groups is, on average, significantly greater than the mean of the individuals. On the other hand, finding concerning groups´ behavior is in line with findings of Shupp and Williams [14] and Vasilkova et al. [16].

Acknowledgements

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Appendix

Domain-Specific Risk-Taking (Adult) Scale – Risk Taking

For each of the following statements, please indicate the **likelihood** that you would engage in the described activity or behavior if you were to find yourself in that situation. Provide a rating from *Extremely Unlikely* to *Extremely Likely*, using the following scale:

1	2	3	4	5	6	7
Extremly Unlikely	Moderately Unlikely	Somewhat Unlikely	Not Sure	Somewhat Likely	Moderately Likely	Extremly Likely

1. Admitting that your tastes are different from those of a friend. (S)
2. Going camping in the wilderness. (R)
3. Betting a day's income at the horse races. (F/G)
4. Investing 10% of your annual income in a moderate growth diversified fund. (F/I)
5. Drinking heavily at a social function. (H/S)
6. Taking some questionable deductions on your income tax return. (E)
7. Disagreeing with an authority figure on a major issue. (S)
8. Betting a day's income at a high-stake poker game. (F/G)
9. Having an affair with a married man/woman. (E)
10. Passing off somebody else's work as your own. (E)
11. Going down a ski run that is beyond your ability. (R)
12. Investing 5% of your annual income in a very speculative stock. (F/I)
13. Going whitewater rafting at high water in the spring. (R)
14. Betting a day's income on the outcome of a sporting event (F/G)
15. Engaging in unprotected sex. (H/S)
16. Revealing a friend's secret to someone else. (E)
17. Driving a car without wearing a seat belt. (H/S)
18. Investing 10% of your annual income in a new business venture. (F/I)
19. Taking a skydiving class. (R)
20. Riding a motorcycle without a helmet. (H/S)
21. Choosing a career that you truly enjoy over a more secure one. (S)
22. Speaking your mind about an unpopular issue in a meeting at work. (S)
23. Sunbathing without sunscreen. (H/S)
24. Bungee jumping off a tall bridge. (R)
25. Piloting a small plane. (R)
26. Walking home alone at night in an unsafe area of town. (H/S)
27. Moving to a city far away from your extended family. (S)
28. Starting a new career in your mid-thirties. (S)
29. Leaving your young children alone at home while running an errand. (E)
30. Not returning a wallet you found that contains $200. (E)

Note. E = Ethical, F = Financial, H/S = Health/Safety, R = Recreational, and S = Social.

Exploring the Emerging Impacts of Open Data in the Public Sector

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Abstract

Open Government Data initiatives, and in particular open data portals, are being developed at the national, regional, local and international level. The increasing availability of open data affects the whole economy. Therefore, this paper explores the emerging impacts of these data in the public sector by using key aspects and attributes of existing e-government development indices. It extends the previously published models and evaluates the impacts of open data enabling factors and also generating mechanisms in the economic, educational, environmental, health, politics and legislation, social, and trade and business development. A method of partial least squares structural equation modelling is used to show the causal relationships between these areas. The results then suggest that the biggest impacts of open data can be found in the educational and social development, however, the attention of businesses is still lacking in this area.

Keywords: open data; open government; impact; public sector; partial least squares

JEL Classification: C39, C52, H83, L86

1   Introduction

As organizations come to depend more on data, lack of access to these data becomes more costly, as they offload more decisions to analytical methods, improper use of these methods or inherent weaknesses in the methods may yield decisions that are wrong and costly. The last few years has seen an explosion of activity around open data and especially Open Government Data (OGD). Subsequently, many governments have started creating interoperability and open data initiatives spanning boundaries between public sector institutions, citizens and businesses to manage their data in a transparent and efficient way [12]. Following initiatives like data.gov or data.gov.uk, numerous international, national, regional and local bodies have started to create open data portals. Recent reports by the United Nations (UN) and the World Economic Forum (WEF) issued and emphasized OGD for their E-Government Survey reports, which summarized how governments utilized these data to better serve and protect their people [12], [14]. Opening data may then allow citizens and businesses to analyse various datasets and understand what governments are spending public resources on. However, affecting widespread impact through the release of OGD relies not only upon the supply of data, but also upon the capacity of users to work with the data, and the ability of government to engage proactively with those users [15].

Jetzek et al. [9] claim that our societies are in the midst of a paradigm shift that transforms hierarchal markets into an open and networked economy based on digital technology and information. In that context, open data is widely presumed to have a positive effect on social, environmental and economic value. However, the evidence to that effect has remained scarce. Further, according to Tinati et al. [11], Open Government is set to become a major aspect of how citizens and governments communicate and share information with each other. Also the WEF emphasizes that open data initiatives and stronger commitments by governments to making information available online will improve transparency, governance, and accountability, because citizens and civil society can now monitor more closely the conduct of civil servants [14]. Finally, Buchholtz et al. [3] estimate that aggregate direct and indirect economic impacts from the use of open data across the whole EU28 economy are of the order of billions Euros annually. Thus, the main aim of this paper is to propose and validate a new model focusing on the various impacts of open data in the public sector.

Although many of the factors that influence the potential impacts of OGD are influenced by histories of government data and the politics of openness, OGD actors are also constructing new spaces, platforms, tools and practices that seek to create new relationships between public sector institutions, citizens and businesses. Each of the hundreds of OGD initiatives taking place across the world need to make decisions about which technical platforms to adopt, the processes by which to choose data, and the extent to which an OGD initiative provides support for particular groups to engage with open data resources to receive the required impact [4], [11].

Through the last few years, several e-government development indices focusing on the evaluation of open data impacts were introduced. These are, e.g., the Web Index and the Open Data Barometer (ODB) index produced by the World Wide Web Foundation (W3F), Open Knowledge Foundation's (OKF) Global Open Data Index (GODI), the OURdata (Open, Useful, Reusable Government Data) Index introduced by the Organization for Economic Co-operation and Development (OECD) and the Public Sector Information (PSI) Scoreboard (PSIS). As the number of the attributes and categories, are lined up across these independent data sources, this should allow to assess the validity of the proposed model and evaluate the impacts of open data.

The Web Index is designed and produced by the W3F and scores are given in the areas of access, freedom and openness, relevant content and empowerment, which cover indicators of economic, social and political impacts of the Web [16]. By compiling data across many different dimensions of Web health and making it freely available, the Web Index helps to deepen and broaden the understanding of how countries can maximize the impact of the Web. First released in 2012, it combines existing secondary data with new primary data derived from an evidence-based expert researcher assessment survey in the areas of gender, open data, privacy rights and censorship [16]. The ODB report aims to uncover the true prevalence and impact of open data initiatives around the world [15]. It analyses global trends, and provides comparative data on countries and regions via an in-depth methodology combining related contextual data, technical assessments and secondary indicators to explore multiple dimensions of open data readiness, implementation and impact. The report scores countries on readiness to secure benefits from the use of open data, including the legal, political, economic, social, organizational, and technical foundations; implementation of open data practice, measured through the availability of data across 15 key categories; impacts of open data, measured through media and academic mentions of data use and impact [15]. The GODI assesses the state of OGD around the world and has been developed to help answer such questions by collecting and presenting information on the state of open data around the world to ignite discussions between citizens and governments. The OECD OURdata Index measures government efforts to implement the G8 Open Data charter based on the availability, accessibility and government support to promote the reuse of data, focusing on the central OGD portal in each country. The PSIS is a tool to measure the status of open data and PSI reuse throughout in the EU. It does not monitor government policies, but aims to assess the overall PSI re-use situation, which includes the open data community's activities.

Tinati et al. [11] examined impact of open data on the United Kingdom (UK) government. They focused on the selected open data portals at various levels and examined them in terms of their commitment, efforts, efficiency and frequency of publishing data. Meng [10] evaluated the relationship between civil society and open data's social impact in selected countries. Author used data from the ODB report, applied the method of Most Similar Systems and fuzzy logic. The results then showed that societies rich in political capital experience greater social impact from open data. Jetzek et al. [8] then measured the social and economic impact of OGD. They utilized the Partial Least Squares (PLS) method and concluded that the impact generation mechanisms are dependent on the enabling factors. Thus, if this relationship is well understood, it is easier to choose the right datasets, data platforms and governance procedures. They extended their model in [9] focusing on the generating of sustainable value from open data in a sharing society, which is enabled by a number of contextual factors that provide individuals with the motivation,

opportunity and ability to generate sustainable value. These two models were later updated and extended to cover more enabling factors and generating mechanisms by Bílková et al. [2].

2   Material and Methods

The aim of this paper is to evaluate the impacts of open data in the economic, educational, environmental, health, politics and legislation, social, and trade and business development. For this purpose, it extends a model presented in Bílková et al. [2], where authors proposed and validated a model suggesting how can be open data as a resource transformed to generate the impact and added value for the public sector. However, they don't evaluate the concrete areas and their impacts. Their model uses five enabling factors as exogenous latent variables and five generating mechanisms as endogenous latent variables to evaluate the impact. Davies and Bawa [4] claim that civic OGD impacts may not result simply from national policy or from a pool of data dominated by government produced data. Consequently, the newly proposed model also considers the trade and business impact, which was omitted in [2]. Furthermore, it solves the limitations presented in [8] by evaluating 86 countries, which offer a bigger sample size, and using only the attributes supported by the literature review for the validation of constructs.

Because of the successful validation of this model in Bílková et al. [2], both enabling factors and generating mechanisms are consider as exogenous latent variables in the newly proposed model. The concrete areas of open data impacts are then endogenous latent variables as can be seen in the Figure 1. Their attributes, type and also source are in the Table 1. The description of exogenous latent variables can be found in [2]. The inner model is consisted of constructs and the outer model is consisted of related attributes.

Figure 1. A structural equation modelling diagram and the description of related elements

Source: Authors

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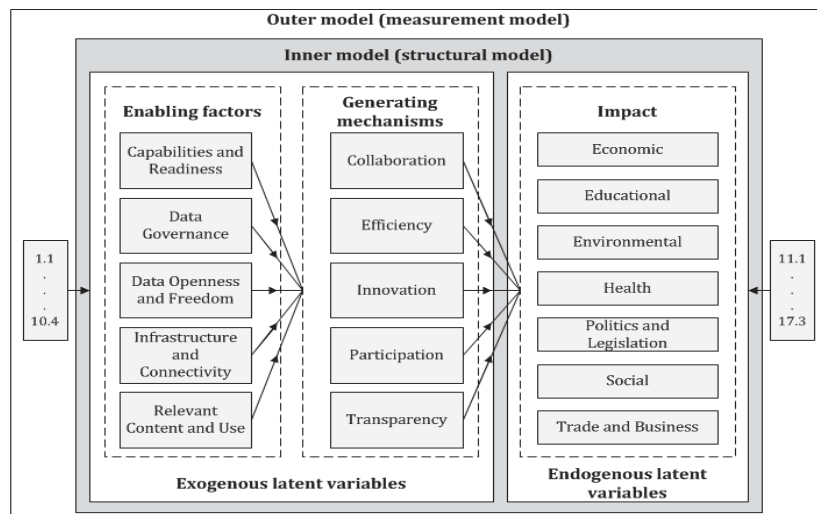
Table 1. Impact areas evaluated and their attributes

Construct	Attribute	Type (measure)	Source
Economic impact (IMP1)	11.1 GDP per capita		World Bank
	11.2 GODI		OKF
	11.3 Impact of open data on the economy		W3F
Educational impact (IMP2)	12.1 Education Index		UN
	12.2 Education and awareness		W3F
Environmental impact (IMP3)	13.1 Environmental Performance Index		Yale University
	13.2 Impact of open data on environmental sustainability		W3F
	13.3 Impact on environmental campaigns/action		W3F
Health impact (IMP4)	14.1 Health Index	Endogenous (reflective)	UN
	14.2 Impact of web-powered ICTs on health outcomes		W3F
Politics and legislation impact (IMP5)	15.1 Political impact		W3F
	15.2 Impact of open data on government efficiency/effectiveness		W3F
	15.3 Impact of open data on transparency and accountability		W3F
Social impact (IMP6)	16.1 Human Development Index		UN
	16.2 Impact of open data on inclusion of marginalised groups		W3F
Trade and business impact (IMP7)	17.1 Global Competitiveness Index		WEF
	17.2 ICT service exports (% of service exports)		World Bank
	17.3 Impact of open data on new business development		W3F

Source: Authors

Structural equation modelling (SEM) is the first generation path modelling widely used by researchers and practitioners to analyse the interrelationship among variables in a model. Some of the researchers classify SEM as the covariance-based SEM (CB-SEM). This method has been, however, argued since its application should achieve the criterion before ever conducting the measurement and structural model. It also requires that sample data under study be of normal distribution [5]. In contrast, Partial Least Squares SEM (PLS-SEM) makes no assumption about data distribution, so it can effectively work with unobservable factors and it takes measurement errors into consideration [1]. Therefore, the PLS-SEM method was established to solve the above defined problem. Its application is aimed to maximize the explained variance of the endogenous latent variables (dependent) by estimating partial model relationships in an iterative sequence of ordinary least squares (OLS) regressions, and minimize the unexplained variances [6]. Latent variables are underlying variables that cannot be observed directly, they are also known as constructs or factors [1], [13]. The most frequently cited reasons to use this method are related to small sample sizes, non-normal data, the use of formatively measured latent variables, and also the unrestricted use of single attribute constructs [5], [6], [7].

There are two sub-models in a structural equation model, the inner model specifies the relationships between the independent and dependent latent variables, whereas the outer model specifies the relationships between the latent variables and their observed attributes (indicators), which can be measured directly, they act as indicators for an underlying latent variable [5], [6], [13]. In the SEM, a variable is either exogenous or endogenous. An exogenous variable has path arrows pointing outwards and none leading to it. Meanwhile, an endogenous variable has at least one path leading to it and represents the effects of other variables [7], [13].

Since the proposed model was derived from the literature, and the aim of this paper is to validate this model, it is important to verify the reliability and validity of the measures used. Outer model assessment involves examining individual indicator reliabilities together with the reliabilities for each construct's composite of measures (i.e., internal consistency reliability), and also the measures' convergent and discriminant validities. When evaluating how well constructs are measured by their indicators, it is needed to distinguish between reflective and formative measurement perspectives [1], [5], [6]. While criteria such as Cronbach's alpha or composite and indicator reliability are usually applied to evaluate reflective measures, an internal consistency perspective is inappropriate for assessing formative ones [5], [6], [13]. Reliability was measured by the estimate of internal consistency and composite reliability. Individual item reliability is the

extent to which the measurements of factors measured with multiple-item scale reflect the true score of the factors relative to the error [1]. Composite reliability (ρ_c) is a measure of the overall reliability of a collection of heterogeneous, but similar items. It is estimated in terms of the outer loading of an item to represent correlations between item and factor and is calculated as (1) [7]:

$$\rho_c = \frac{\left(\sum \lambda_i\right)^2}{\left[\left(\sum \lambda_i\right)^2 + \sum Var(\varepsilon_i)\right]}\qquad(1)$$

where λ_i is the outer (component) loading to an indicator, and $Var(\varepsilon_i) = 1-(\lambda_i)^2$ is in case of standardized indicators. Internal consistency is calculated for the number of model items (N) and mean inter-correlation among items (r) using Cronbach alpha (α). The Cronbach alpha measures how well a set of items or factors measures a single uni-dimensional factor and it is calculated as (2) [7]:

$$\alpha = \frac{N-r}{1+(N-1)-r}\qquad(2)$$

Validity was measured by the estimate of convergent validity and discriminant validity of model factors. Discriminant validity indicates the extent to which a given factor differs from other factors. Convergent validity is the extent to which items of a factor represent the same factor and it is measured by Average Variance Expected (AVE), which is calculated to determine the amount of variance that a factor captures from its measurement items as equation (3) [7]:

$$AVE = \frac{\sum \lambda_i^2}{\left[\sum \lambda_i^2 + \sum Var(\varepsilon_i)\right]}\qquad(3)$$

3   Results and Discussion

The main tool used is SmartPLS 3, because it is freely available to the research community. Firstly, data were pre-processed in Microsoft Excel 2010. Then, the dataset was converted into .csv file format and uploaded into SmartPLS. Here, the inner model of latent variables was built. Further, the outer model was built by linking the indicators to the related latent variable. When formative indicators exist in the model, the direction of the arrows has to be reversed. That is, the arrow should be pointing from the formative indicators to the latent variable in SmartPLS. The settings of the PLS algorithm were configured with these parameters – weighting scheme: path; maximum iterations: 750; stop criterion: 10^-5 and initial weights: 1.0. All measures were also standardized before running the PLS algorithm.

In the PLS-SEM diagram, which can be seen from the Figure 2, there are two types of numbers – numbers in the circle: these show how much the variance of the latent variable is being explained by the other latent variables; and numbers on the arrow, which are called the path coefficients and explain how strong the effect of one variable is on another variable. The weight of different path coefficients enables to rank their relative statistical importance [1], [13]. These values may be understood in the same meaning as a regression coefficient (although they are not the same), so the value varies (generally) from 0 to 1, indicating the size of the effect for that specific path. Positive and negative values indicate the reciprocity of the relation, i.e. that positive values show proportional modulation and negative values indicate inverse relations [7].

By looking at the SEM diagram, the following preliminary observations can be made. The coefficient of determination (R^2) is 0.530 for the IMP1 endogenous latent variable, 0.631 (IMP2), 0.601 (IMP3), 0.560 (IMP4), 0.547 (IMP5), 0.636 (IMP6) and 0.469 (IMP7). For R^2 of 0.75 it is substantial, 0.50 is moderate, and 0.25 is weak [5], [13]. This means that the exogenous latent variables substantially explain 63.6 % of the variance in the IMP6 and 63.1 % of the variance in the IMP2. Therefore, it can be concluded that the impacts of open data are still in early stages of

development. Only educational and social impact may be emphasized as important areas for open data. The results also suggest that the attention of businesses is still lacking in this area.

Figure 2. The PLS-SEM diagram with the path coefficients and coefficients of determination
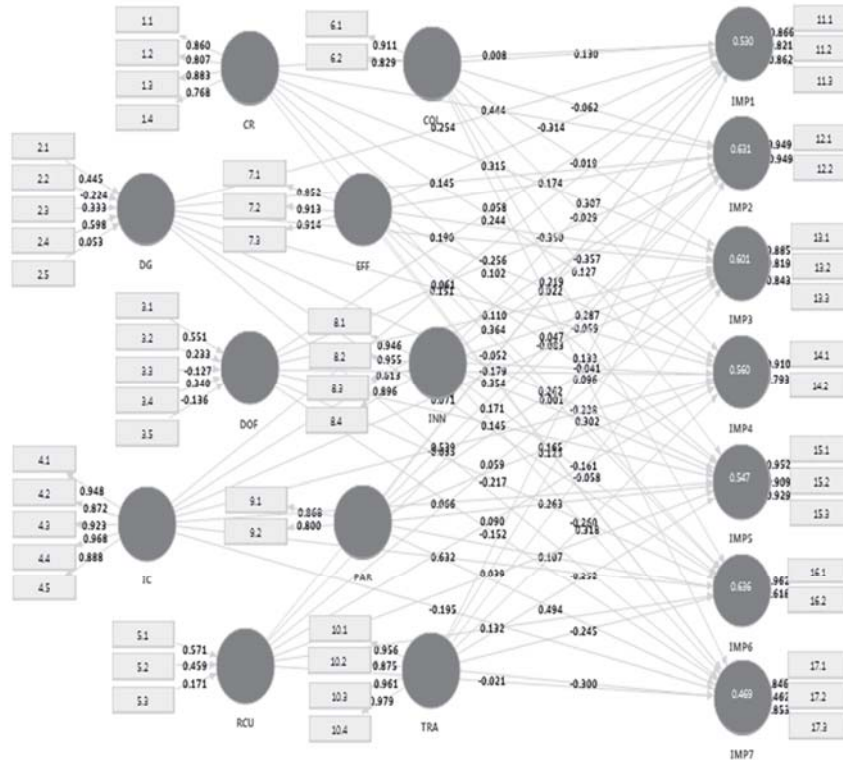
Source: Authors

One of the concerns with formatively measured constructs is multicollinearity across the indicators of each construct [6]. High first eigenvalues can be an indicator of multicollinearity, however, all formative construct´s first eigenvalues are lower than 3. Also all Variance Inflation Factors (VIFs) are below the recommended 5 value [5]. Table 2 then presents the reliability and validity of the latent variables (reflective outer model) to complete the examination of the inner structural model.

Table 2. Results summary for the reflective outer model

Construct	Indicator	Indicator reliability	Composite reliability	Cronbach's alpha	AVE
IMP1	11.1	0.750			
	11.2	0.674	0.886	0.810	0.723
	11.3	0.743			
IMP2	12.1	0.901			
	12.2	0.901	0.948	0.890	0.901
IMP3	13.1	0.783			
	13.2	0.671	0.886	0.808	0.721
	13.3	0.711			
IMP4	14.1	0.828			
	14.2	0.629	0.842	0.639	0.729
IMP5	15.1	0.906			
	15.2	0.826	0.951	0.922	0.865
	15.3	0.863			
IMP6	16.1	0.925			
	16.2	0.516	0.783	0.615	0.654
IMP7	17.1	0.716			
	17.2	0.503	0.776	0.604	0.552
	17.3	0.728			

Source: Authors

Indicator reliability, measured as square each of the outer loadings numbers, 0.7 or higher is preferred. If it is an exploratory research, 0.4 or higher is acceptable [6]. Internal consistency reliability, which is measured as composite reliability and also Cronbach's alpha, should be 0.7 or higher. If it is an exploratory research 0.6 or higher is acceptable [5], [6]. Convergent validity, measured as AVE, can be accepted when the value is greater than 0.5 [5], [13]. Otherwise, these indicators should be removed from the measurement model, since they indicate that the selected indicators have less contribution towards the related constructs [7]. This procedure is known as uni-dimensionality procedure. This assessment should be applied in order to improve model's reliability and validity [7]. In this model, the IMP6 and IMP7 are very close to the critical values, thus, the related indicators should be examined more precisely in the future research.

Discriminant validity (as Fornell-Larcker criterion) values were obtained from the square root of AVE value and are shown in the Table 3. The diagonal values (in bold) are the square root of AVE, while the other values are the correlations between the related constructs. In this case, the discriminant validity is achieved when the AVE of each latent variable should be higher than the squared correlations with all other latent variables. Thereby, each latent variable shares more variance with its own block of indicators than with another latent variable representing a different block of indicators [5], [7]. The results indicate that their validity is well established.

Table 3. Fornell-Larcker criterion analysis for checking the discriminant validity

Construct	IMP1	IMP2	IMP3	IMP4	IMP5	IMP6	IMP7
IMP1	**0.850**						
IMP2	0.693	**0.949**					
IMP3	0.846	0.783	**0.849**				
IMP4	0.767	0.841	0.841	**0.854**			
IMP5	0.849	0.685	0.849	0.782	**0.930**		
IMP6	0.808	0.807	0.809	0.800	0.804	**0.808**	
IMP7	0.776	0.667	0.793	0.738	0.802	0.780	**0.803**

Source: Authors

In contrast to [2] and [8], where the PLS-SEM method was already used, this paper defines and evaluates the concrete areas of open data impacts in the public sector and analyse the casual relationships between them in the context of enabling factors and generating mechanisms. It also solves data source limitations mentioned in these studies, e.g. using data from [15] and [16].

4 Conclusion

The public sector produces, collects, processes and disseminates a large amount of data. These can be reused, combined and integrated to create new value-added services and products with potentially significant impacts in the global economy. However, the importance of open data portals at various levels has to be emphasized by governments in their Open Government initiatives. They are the main source of open data and without them no impacts can be achieved.

Findings of this paper generally provide a way for policymakers, technology practitioners and other stakeholders who are interested in propagating Open Government across the country. The impacts in the concrete areas can be then achieved by focusing on the enabling factors and generating mechanisms and their continuous improvements. In addition, factors that determine the impacts of open data together with related attributes provide new insights for future studies on Open Government improvement evaluations and e-government development indices.

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Advancing Comparative Research on the Extent and Impacts of Intermunicipal Cooperation

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Abstract

Why do municipalities cooperate and what are the main impacts of such cooperation? Though intermunicipal cooperation (IMC) is not a new public administration topic, answers to these basic questions remain unsettled. In an effort to address these questions, this paper scopes a cross-national comparative research agenda on IMC by 1) identifying data sources and methods that can reveal the extent and impacts of IMC in the Czech Republic and the US and 2) characterizing the implementation of IMC in these settings. The results of this preliminary research demonstrate a variety of country and sub-country approaches to implementing and collecting data on IMC, suggesting that the development of robust evaluation criteria in two discrete settings—the Czech Republic and the US Mid-Atlantic region—could advance understanding of IMC and its impacts.

1 Introduction

The idea that local governments should cooperate to deliver services has a long history in scholarship and practice. The anticipated, commonsense benefits of intermunicipal cooperation (IMC) are clear and alluring—IMC can enable optimally-sized governance arrangements that provide economies of scale and the resources necessary to provide the appropriate scope of services. However, the implementation history of IMC across institutional contexts has not been one of steady consolidation or consistently increasing cooperation. Cooperation has increased in some geographic and functional settings, but fragmentation trends persist. Further, significant challenges remain for evaluating the fiscal and non-fiscal impacts of IMC. Even in cases where evaluations have been conducted, the evidence does not unequivocally support IMC.

With this paper, we seek to scope a cross-national comparative research agenda on IMC by identifying data sources and methods that can reveal the extent and impacts of IMC in the Czech Republic and the US and characterizing the implementation of IMC in these settings. The remainder of this introduction section reviews the general logic of the IMC concept in the US and European contexts. This paper generally explores comparsions between these contexts, with particular focus on the institutional settings of the authors—the US state of Delaware and the Czech Republic. The materials and methods section provides an overview of the data sources and basic approach used to conduct a preliminary comparison of the IMC context and outcomes in these settings. In the results and discussion section, we apply these data to speak to the character and extent of IMC across these settings. Finally, we summarize our findings and propose a future cross-national research agenda on IMC.

Ostrom, Tiebout, and Warren [13] present one of the earliest assessments of what others refer to as the problem of metropolitan government—"[the] multiplicity of federal and state governmental agencies, counties, cities, and special districts that govern within a metropolitan region". While Ostrom, Tiebout, and Warren [13] acknowledge this problem definition, they also find that the existence of formal fragmentation tends to cloud the widespread lines of informal communication and cooperation that exist across governments. This said, the basic notion of "too many governments" and "too much fragmentation" persists. Oakerson [12] acknowledges a

proliferation of special districts and small local governments in the US context, but also suggests that arriving at a so-called optimal number of governments from a fiscal perspective may run counter to expressing the local preferences of residents. Sedmihradská [15] asserts that IMC units offer an efficient, equitable, and feasible solution as they can improve situations in small municipalities through information provision and the design of targeted measures. Similarly, Bel and Fageda [3] view IMC as a way to achieve a more optimal level of local service production.

Warner [19] summarizes a common view on the need and appeal of IMC that, while written with the US context in mind, cuts across institutional settings: "We have a problem with political fragmentation...Rural governments are too small to enjoy economies of scale in service provision and they experience difficulty in attracting professional managers and in producing highly technical services. In urban areas, political fragmentation creates problems with regional coordination and inequity in the quality and quantity of public goods across the metropolitan region...Thus at both the urban and the rural scales, cooperation is a policy and practice that enjoys substantial political support."

While IMC trends and forms differ internationally, it is a widespread phenomenon. For example, Warner [19] cites IMC as the third most common way of providing local government services in the US, after direct production and privatization. Internationally, the general trend toward IMC is increasing, with the recent financial crisis spurring some efforts. For this paper, we accept the existence of IMC as a reality of public administration that is likely to continue to grow in use and complexity. We view the chief challenge of this environment for analysts and researchers as the need to search out data and evaluate IMC's utility within the current tangle of relevant information. The rise of open data in the government sector is one contributing factor to both the rise of relevant information and the evaluation challenge.

Table 1 summarizes the findings of select international IMC literature focused on impact analysis. The reviewed findings suggest no clear and overwhelming relationship between cooperation and fiscal costs, regardless of the cooperative domain. This finding contrasts with the general hypothesis that IMC necessarily results in economies of scale. We take this finding of lack of consistency in cost impacts as evidence of the need to use robust data and methods to evaluate and compare IMC in discrete settings. The remainder of this paper focuses on assessing the context for IMC and its evaluation in the US and Europe, generally, and the state of Delaware and the Czech Republic, in particular.

Table 1. The overview of IMC impact analysis

Authors	Sample	Purpose	Result
Bel and Costas [6]	186	solid waste spending	cooperation saves cost
Sorensen [16]	211/311	solid waste spending	cooperation increases cost
Bel and Mur [5]	56	solid waste	cooperation saves cost
Bel and Fageda [4]	65	solid waste	cooperation could save cost trough economies of scale in municipalities with 50,000 inhabitants or less
Dijkgraaf and Gradus [8]	431/548	solid waste	cooperation saves cost
Zafra-Gomez et al. [20]	923	solid waste	cooperation saves cost
Garrone, Grilli and Rousseau [11]	27	water, electricity, gas, waste	cooperation increases cost
Frere, Leprince and Paty [9]	2895	local public spending	cooperation has no significant impact
Bel, Fageda and Mur [2]	85	solid waste	cooperation saves cost
Dijkgraaf and Gradus [7]	500	solid waste	cooperation saves cost

Source: Authors based on [1]

2   Material and Methods

This section outlines, in brief, the approach used to compare the context for IMC in the US and the Czech Republic, and reviews the data sources available for this assessment. The

approach for this paper focuses on gathering cross-sectional data sources that can illuminate the context for IMC on three fronts—1) the number of governments and variety of types, 2) the extent and characteristics of IMC use, and 3) the impacts of IMC. These fronts roughly equate to the information that can be used to assess the needs for IMC, trends in IMC use, and outcomes from IMC.

Conducted every five years, and last completed in 2012, the US Census Bureau's Census of Local Governments provides the most comprehensive data on the number of governments by type in the United States. This census focuses on collecting data on the presence and characteristics of general purpose governments at the state, county, and subcounty levels. Data is also collected on school districts and special districts. These governments exist to provide services in one domain, such as education, waste disposal, or drinking water provision, and may or may not be coincident with subcounty or county levels of government. For the purposes of this investigation, subcounty and special district data provides the data most relevant to IMC. The Czech Statistical Office compiles comparable data for that setting.

Data on the use of IMC is much more limited in the US context. The most comprehensive assessment of IMC use comes from the Profile of Local Government Service Delivery Choices surveys conducted by the International City/County Management Association. To the knowledge of the authors, this survey was last completed in 2007. Approximately one-sixth of US municipalities were surveyed and approximately one-in-four responded about how they provided services (e.g., purchased privately; IMC; See Profile of Local Government Service Delivery Choices 2007). Compared to census data, this survey provides a much more limited view of IMC activity by the approximately 39,000 US municipalities. To the degree that consolidation represents a form or variant of IMC, the US Census Bureau's regular Boundary and Annexation Survey provides systematic evidence of this form of behaviour (See Boundary and Annexation Survey 2015). While the Czech Republic does not collect data on IMC in a systematic way, Sedmihradská [15] reported on the use of voluntary municipal associations in a way that reflects a more precise measurement of their existence relative to the understanding in the US.

Data that can be used to assess the impacts of IMC is limited in both settings. In the US, the Government Employment & Payroll and Government Finance components of the Census Bureau's Census of Governments provide basic financial data on US governments. However, data on individual municipalities is difficult to acquire. To the degree that instances of IMC are known, changes in financial data may be measured to assess the impacts of IMC. In the Czech context, UFIS, the Ministry of Finance's official database, provides financial statements, budgetary documents, and census materials that could be used in a similar fashion to assess IMC impacts. In both contexts, significantly more data is available outside the constraints of a cross-sectional format, suggesting that a case study approach to evaluation may be both necessary and fruitful.

3 Results and Discussion

3.1 Number of Governments

Tables 2 and 3 present the number and percent of municipalities by population size range in the Czech Republic and the US, respectively. Municipalities in the Czech Republic are small and extremely fragmented. Out of approximately 6,250 municipalities, more than 85 percent, have less than the average number of inhabitants [15]. This relatively high number of municipalities creates challenges in delivering sufficient public services to all inhabitants. The capacity of municipalities is strictly limited by technical infrastructure, civic amenities and the way they are funded. The US also demonstrates significant fragmentation, with municipalities with fewer than 1,000 people accounting for almost half the number of subcounty general purpose governments. Similarly, in the US state of Delaware in 2007, municipalities with a

population less than 1,000 accounted for 26 of the 57 municipalities, with 40 municipalities having populations less than 2,500.

Table 2. Size of municipalities

	Number of municipalities	%	Population	%
0-199	1561	25,0	193328	1,8
200-499	1991	31,9	651689	6,2
500-999	1330	21,3	935658	8,9
1000-1999	700	11,2	972484	9,3
2000-4999	392	6,3	1184204	11,3
5000-9999	142	2,3	964895	9,2
10000-19999	70	1,1	981219	9,4
20000-49999	42	0,7	1243739	11,9
50000-99999	15	0,2	1058196	10,1
Over 100000	6	0,1	2282130	21,8
Total	**6249**	**100,0**	**10467542**	**100,0**

Source: [1]

Table 3. Number and population of US town and municipal governments by population size class, 2012

	Number of municipalities	%	Population	%
0-1000	17721	49,4	6564893	2,6
1000-2499	7182	20,0	11588562	4,6
2500-4999	3992	11,1	14165530	5,6
5000-9999	2761	7,7	19526323	7,7
10000-24999	2335	6,5	36486625	14,4
25000-49999	1027	2,9	35476006	14,0
50000-99999	547	1,5	37918503	15,0
Over 100000	314	0,9	91632809	36,2
Total	**35879**	**100,0**	**253359251**	**100,0**

Source: [17]

3.2 Use of IMC Model

Intermunicipal cooperation is a widespread phenomenon in the Czech Republic, and only a few municipalities are not involved in these arrangements in some form. The Czech law on municipalities allows three basic forms of intermunicipal cooperation: contracts, mutual legal persons, and voluntary municipal associations. The voluntary municipal association is a special legal form designed for intermunicipal cooperation. Municipalities are familiar with this form and use it frequently [15]. Currently there are about 720 voluntary municipal associations in the Czech Republic, with Figure 1 demonstrating the robust growth in adoption in recent years. Table 4 demonstrates that this growth in IMC is consistent with a reduction in the number of Czech municipalities from over 11,000 in 1921 to just over 6,000 in 2015.

Figure 1. Number of VMAs, Microregions and Share of Microregions

Source: [15]

48
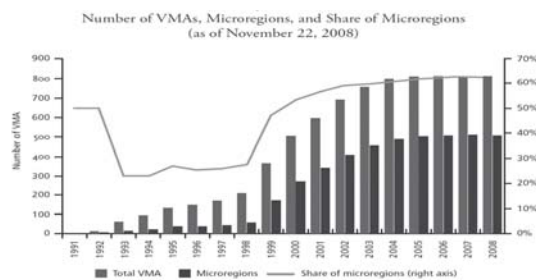
Table 4. Trends in the number of municipalities in the Czech Republic 1921 - 2015

Year	1921	1930	1947	1961	1970	1989	2015
Number of municipalities	11,417	11,768	11,695	8,726	7,509	4,120	6,252

Source: Adapted [14]

While statistics on the subject of IMC are lacking in the US, Figure 2 provides data on the growth and change in governments by type over the last 70 years. The number of subcounty governments has remained relatively stable at slightly fewer than 40,000. Significant consolidation has occurred in the number of school districts, with a decrease from over 100,000 in 1942 to 12,880 in 2012. At the same time, special districts, which can represent cooperation across general purpose government lines, have increased from 8,299 in 1942 to 38,266 in 2012—outnumbering the 35,879 subcounty general purpose governments in the US. This imbalance is more pronounced in Delaware, with special districts outnumbering general purpose, subcounty government 260 to 57.

Figure 2. US Governments by Type 1942-2012
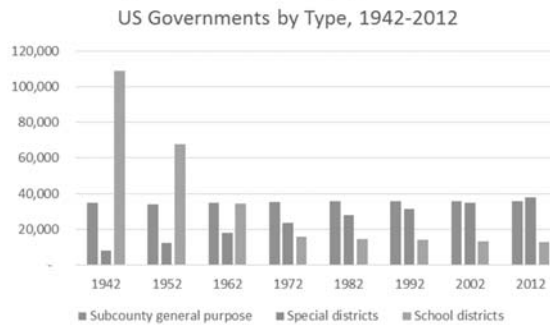
Source: [17], [18]

3.3 Impacts and Character of IMC

A comparative assessment of fiscal costs resulting from IMC is beyond the scope of this paper. This brief section recounts portions of the institutional setting of IMC in the Czech Republic and the US state of Delaware. In the Czech Republic, the voluntary municipal association (VMA) is a special type of legislative entity established for IMC. A VMA does not substitute for a local government but applies state legislation on budgetary rules for territorial entities to assist municipalities with the delivery of public services, including support of tourism, infrastructure investments, and place-based marketing. According to Sedmihradská [15] a VMA can be founded by two or more municipalities that need not be contiguous. One municipality can be a member of several VMAs. The VMA is established based on a contract that must be approved by the municipal councils of all participating municipalities. The VMA legally results when the regional office registers it, with statistical data for VMA collected for finance purposes. The VMA ends its existence based on an agreement, lapse of the designated period, or fulfilment of the task defined in the founding contract [15]. VMAs have three main financial sources: member contributions, non-tax revenues resulting from their own business activity, and external resources such as grants or subsidies [10].

Formal IMC is limited in Delaware, though the Delaware Municipal Electric Corporation (DEMEC) and the local service function budget provide some evidence of cooperative behavior amongst municipalities and counties. Incorporated in 1979, DEMEC is managed by 9 municipalities for the purpose of reliably delivering electricity to the member communities. The

arrangement represents a relatively classic form of IMC aimed at providing the scale necessary to provide certain services. Only 28% of Delaware's population is incorporated in municipalities, compared to nearly 63% across the US, with management of the remaining areas falling to Delaware's three counties [18]. Coupled with the small size of many Delaware municipalities, a substantial local government role is played by the State of Delaware and its counties. For municipalities in New Castle County, Delaware, the local service function budget governs part of this relationship. Residents in those municipalities that do not receive services from the County effectively receive a tax credit, while those in County-served municipalities pay the appropriate portion of county taxes. While Kent and Sussex counties are becoming more full-service counties like New Castle County, a similar arrangement of revenue distribution and service provision does not exist in those two Delaware counties.

4 Conclusion

Judged by the results of evaluations reviewed for this paper, lowering municipal costs is not justification on its own for an IMC approach in many cases. That said, the sample of cases where IMC impacts has been analyzed remains small. One reason for this is the lack of robust cross-sectional data on the use of IMC. Further complicating matters is the lack of cross-sectional data that could be used to evaluate IMC impacts. For example, US Census of Governments finance data only allows for gross estimation of the impacts of consolidation and cooperative behavior. In the US context, much data for tracking and evaluating IMC is likely to originate at the state level. For example, the Office of the New York State Comptroller has state-wide data on cooperative efforts and their legislative backing.

To improve the implementation and evaluation of IMC across contexts, the authors intend to initiate a comparative research agenda focused on defining, tracking, and evaluating IMC criteria in the US Mid-Atlantic and the Czech Republic. These environments reflect the settings of the authors, with the extension of Delaware to the Mid-Atlantic necessary to increase the sample size beyond one of the smallest US states. Data available in the Czech Republic provides a good starting point for the contents of an evaluation framework. Assembling data on the location and character of IMC in the Mid-Atlantic will be necessary. For IMC areas and their counterparts, other variables of interest are the number of residents, houses, students, and businesses, along with their characteristics; the cadastral area and land use characteristics; and municipal revenues, assets, and expenditures across these areas. The collection of these data points will help to build an evaluation framework that accounts for the conditions in treated areas (i.e., those areas with IMC in place) and control areas for evaluation purposes (i.e., those areas with no IMC in place). Initial research will focus on assessing IMC efforts in one domain (e.g., economic development marketing IMC) so that the data collection and analysis process may be kept relatively narrow.

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Social Innovations in Slovakia: Success versus Failure

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Abstract

The objective of this paper is to present the factors that were the key differences between successful and failed social innovations in a co-creation initiative in Slovakia. Out of 33 implemented projects in this initiative we analyzed 21 final reports for the co-creation projects and selected 5 cases for an in-depth analysis. With 5 representatives of the co-creation projects we conducted structured interview, based on methodology of LIPSE project (Learning from Innovation in Public Sector Environments, project that focuses on identifying drivers and barriers of social innovation and its outcome). Generally, most of the failures are connected with the role of the innovation initiator and the neutral or even negative attitudes of local governments to any co-creation initiative due to overloaded schedules of public servants. Our analysis shows also other factors that account for social innovation failure.

Keywords: co-creation; social innovation; failure,; public spaces

JEL Classification: H43, H44, L33

1 Introduction

Innovations have always been a subject of research of many economists [e.g. 21, 22, 24]. Current economic theory defines innovation as creation of a new or improved product that better reflects the needs of the consumer or the introduction of new production, management or marketing methods to increase the effectiveness and efficiency of the product or the provision of services. In public sector the innovation is linked to the creation of "public value in terms of increasing the efficiency, quality and transparency of public services" [14]. Innovation in the public sector should bring in the provision of public services not only economic value but also legal and democratic values. The innovation of public service must meet the needs of the public or needs of society or a particular community whose members are involved in the process of creation and implementation of innovation.

1.1 Social Innovation and Co-Creation

The marketization of public services aims at a continuous increase in public expenditure efficiency, continual improvements in public services quality, the implementation of the professional management tools in the public sector, emphasis on the plurality system of ownership forms in public service delivering: public-private-civil sector mix, partnerships, cooperation and co-creation in public service delivery [7, 12, 20]. The participation of citizens in the development and subsequent implementation of co-creation is of great importance in terms of the success of the public service innovation process [17]. Indeed, in social innovation, the production of public services is considered to be an open process, with the involvement of end users in the design and development of goods and services [4, 23, 27], it is also considered to represent a change in the relationships between the involved stakeholders [2]. One of the central elements in the concept of social innovation is the active participation of citizens and grassroots organizations in order to produce social outcomes that really matter [1]. Direct participation of citizens in the innovation process and in introducing the innovation into practice is of great importance in terms of the success of the innovation process [3, 6, 27]

From this point of view, we can speak of co-creation itself as a public service innovation or, in other words, a social innovation. For innovation in the public sector to be successful, there must be consistency between the character of the innovation and the environment where the innovation takes place. The innovation process requires legitimacy [29], political sustainability [14] strong democratic values [1] and respect for the needs of the citizens [10].

Yet, there are cases when social innovation fails and co-creation does not bring the anticipated results. Failures of social innovations are determined by various factors, e.g. idea of innovation may be too expensive, not wanted, insufficiently useful, not good enough relative to the alternatives or flawed by unforeseen side effects [16], failure to embrace social capital [11] or because subset of social innovations are business innovations and profit seeking leads to failure of the innovation [19]. Mulgan [15] also states that social innovation fails due to the lack of adequate mechanisms to promote them, adapt them and then scale them up and the lack of government response.

In this paper we focus on identifying the factors that accounted for success or failure in a co-creation initiative "PrieStory" in Slovakia. This initiative was analyzed as a case of co-creation in a research project LIPSE by a group of researchers from Matej Bel University. In this paper we partly present results of the analysis to outline the main effects of co-creation but the aim is to present the factors that were the key differences between successful and failed innovations in the initiative PrieStory.

2 Material and Methods

The research in this study is realized as a part of LIPSE research project - ''Learning from Innovation in Public Sector Environments'', project studying the drivers and barriers of social innovations in the public sector. The study research methodology is given by the project research methodology (for further details about the methodology see 17, 18).

The research questions were:

1. What are the different types of co-creation? (Focusing on positions of the involved actors and the coordination mechanisms that are used across seven countries in different regions of the European Union, in our case in Slovakia).
2. What are the relevant drivers and barriers that account for the success or failure of co-creation processes between EU countries (Slovakia)? (Specific attention is paid to the influence of governance style and state tradition).
3. What are the outcomes in terms of value creation of social innovations that are based on co-creation in relation to the expected benefits for the involved stakeholders, including the weak interests of citizens? (Especially this question is interesting in Slovakia, whether it is a weak interest of citizens of a weak interest of local governments).

We used qualitative methods to analyze co-creation during innovation in public services delivery. To develop the inventory of relevant practices in which either citizens or other actors are involved we conducted an extensive document analysis of relevant policy documents, databases and websites and more than ten expert interviews, which led us to compiling of list of 10 case studies as this was a number set by leaser researcher in LIPSE project (for the full list see 18). The LIPSE leader, Erasmus University Rotterdam, chose two cases for in-depth analysis. In this paper we focus on one of the cases, co-creation based social innovation in program PrieStory.

2.1 Co-creation in PrieStory

The PrieStory program aims to involve people in improvement of the living environment, increase the public participation (which is one of the trends in public service delivery) and to strengthen the communities. This program allows realization of low cost investment projects

executed by volunteers living in the area. The examples of products might be parks, sport places, green places, etc. All projects shall allow for disabled access [17]. The program is implemented as an open competition where community groups are eligible to apply for grant and technical assistance. Role of Ekopolis foundation as public service innovation initiator is to provide financial and technical support.

The PrieStory program involves:

- the provider of the public service (municipalities/local governments),
- the co-designers of the public service (citizens),
- the public service innovation initiators (Ekopolis Foundation and Partners for Democratic Change Slovakia PDCS– NGO),
- the public service innovation co-financer (CSO Bank – private corporation).

These relevant actors were identified by analyzing policy documents and by interviewing the initiators of the co-creation process – Ekopolis Foundation. We have followed the interview protocol designed by the LIPSE research project leader and we interviewed all involved stakeholders. Based on the interviews and in triangulation with official reports about the co-created initiative, we identified some outcomes and effects of co-creation processes in the PrieStory program at the local government level (Table 1).

Table 1. Schematic display of co-creation effects in PrieStory program

Outcomes of co-creation	Effects
Quantity of output	Between 2005 and 2011, 33 public spaces were redesigned.
Quality of output	The quality of public spaces increased (citizens as the co-designers are more satisfied with the service than before the co-created initiative).
Formal effectiveness	Absent public facilities were provided and citizen needs were better addressed.
Efficiency	Public facilities were provided in the least expensive way in term of public finances. Between 2005 and 2011, more than 174 thousand EUR was assigned through the Ekopolis Foundation; much more was given in terms of volunteer work, which is hard to measure and express in financial value; other donations came from the private sector, both financial and non-financial (i.e. material, know-how, etc.).
Customer satisfaction	By involving the citizens as co-designers, their needs were taken into consideration. As volunteers, the citizens played a vital role in the co-creation process, which led to greater satisfaction with the provided public facilities.
Accountability	A co-created initiative clarified who is accountable for what part of the service.
Equity	Co-creation led to a more equal distribution of public services.
Responsiveness	Public spaces are better able to meet citizen needs and criteria.
Fairness	Co-creation led to a more fair distribution of public services.
Trust	Trust in the public institutions increased.
Public Participation	Public participation was increased.

Source: [12]

The co-creation in the PrieStory program brought more efficient and more effective public service delivery in a rural/regeneration sector. The demands on the municipal budget decreased and citizen participation increased. In general, the co-created initiative has a positive impact on public service delivery in term of effectiveness, efficiency, and equity [17]. But in those 33 redesigned public spaces between years 2005 – 2011, there are also cases when the co-creation initiative was not always a success story.

In the PrieStory program there were several failures of social innovations. We compare these cases with the selected successful cases in order to identify the factors that differentiate successful cases from the failed ones. As a failure in innovation we consider when the public spaces renovated in co-creation process is no longer used, i.e. after the particular project within PrieStory program finished, the public space was no longer used and its conditions and environment is the same as it was before the renovation of even worse. If the renovated public space is still used or even upscaled, we consider it as a successful innovation.

Out of 33 implemented projects in program PrieStory we had 21 final reports [5] for the projects, with 5 representatives of co-creation initiatives in these projects we conducted structured interview. The failed cases were the playground for kids in Kežmarok and the relax zone in Handlová, the successful stories were in cases of open air reading park in Žilina, Tilia – relax and educational area in Rajec and town square in Pohorelá.

Based on theoretical presumptions on innovations to be successful as presented in the introduction, we summarised them into a table 2 and compared them between successful and failed cases of social innovation in co-creation process in PrieStory program.

Table 2. Key factors of success/failure in social innovation

Factor\ Case	Žilina (2005)	Kežmarok (2006)	Rajec (2007)	Pohorelá (2008)	Handlová [2011]
Initiator of innovation	Regional public library (public services provider) in cooperation with 6 citizens	Local kindergarten (public services provider)	NGO	Local self-government	Local community of citizens
Consistency	Yes	Yes	Yes	Yes	Yes
Legitimacy of innovation	Yes	Yes	Yes	Yes	Yes
Political sustainability of innovation	Yes	N/A	N/A	Yes	N/A
Democratic values	Yes	Yes	Yes	Yes	Yes
Direct participation of citizens	Yes	Yes	Yes	Yes	Yes
Use or strengthening of social capital	Yes	Yes	Yes	Yes	Yes
Respect of citizens' needs	Yes	Partly	Yes	Yes	Partly
Feeling of ownership	Yes	No	Yes	Yes	Partly/No
Unforeseen side effects	N/A	N/A	N/A	N/A	N/A
Social innovation turned into business	No	No	No	No	No
Adequate promotion of public space (innovation)	Yes	Partly	Yes	Yes	No
Government response	Re-established participation	No support	Cancelled participation	Full support	No support
Upscaling of innovation by government	No	No	No	Yes	No
Total costs of the innovation	21,602 €	10,614 €	14,466 €	24,397 €	5,500 €
Long-term use after official end of the project	*Yes*	*No*	*Yes*	*Yes*	*No*

Source: Authors

3   Results and Discussion

Consistency between the character of the innovation and the environment where the innovation takes place was observed in all five cases, the same can be said about the legitimacy of the innovation: these were all public spaces renovation projects, thus they all had to be legitimate. As a political sustainable were only two out of 5 cases, these had support from local counselors which might be connected with the fact that initiators of these two cases were public sector organizations. Democratic values can be considered for increased in all cases: public participation was increased in public debates on the look of public spaces, every resident could come and express their opinion. On the other hand, to speak about willingness of citizens to participate is difficult, in several cases the participation of citizens was a sort of directive from the local self-government in order to comply with the program condition and be able to get the grant because direct participation of citizens was a core assumption stressed by program PrieStory methodology, it required joint construction of new urban space with citizens as volunteers.

One of most important goals for projects in PrieStory program was to establish partnership of all key stakeholders based on social cohesion and personal investment in the community. All interviewed actors agreed that the existence of social capital is one of the key success factors for co-creation activities and social capital is also developed by co-creation activities.

Citizens´ needs were taken into account in all cases but for projects in Kežmarok and Handlová we can state this was done only partly due to the fact that these projects aimed on renovation so the space could be used by families (mothers) with little children, i.e. other groups of citizens were excluded. Hardin's tragedy of common theory reasoned that a self-interested rational actor will decide to increase his or her exploitation of the space since he or she receives the full benefit of the increase, but the costs are spread among all users [8]. Result of such situation is demolished public spaces, that the citizens do not feel the ownership. In our cases the representatives from projects in Žilina, Pohorelá and Rajec similarly indicated that involving citizens are in planning of urban space design and in its construction also helps to develop feeling of ownership to this space. They also add that this is very important not only for urban space construction, but also for its maintenance. Here we can see the first difference between successful and failed innovation project: in the failed cases the feeling of ownership was not fully developed due to the limited respect of citizens´ needs (only certain groups of citizens were included in to the planning, renovated urban spaces were designated only for young families with children).

Neither unforeseen effects that could have caused failure of the innovation projects were observed, nor any of the social innovations turned into a business later on.

The promotion of innovation was adequate in three cases, in Kežmarok there were some press releases in local media but these were not sufficient when compared to the other cases where bigger effort to spread information about renovated urban spaces was made. In one case (Handlová) the promotion was totally inadequate, only at the local community webpage which had rather limited attendance. This factor seems to be another important difference between successful and failed innovation.

The response of government varies, involved local and regional government either did not support the initiative form the very beginning or cancelled their participation in running co-creation projects. Only one case (Pohorelá), where the initiator was the local self-government, had a full support of the government for the whole project. In one case (Žilina), the actors indicated that after a dialogue with government representatives the cooperation with the local government was re-established. From the analysis it is clear that successful innovations had the government support (at least from the beginning), but the unsuccessful cases had no support (no cooperation established with the government) at all.

The innovation was upscaled by government only in the case of Pohorelá where the initiator was the government and the project aimed at the renovation of town square, indeed a public space for everybody. This fact is connected with the next factor of total costs of the innovation project. The interviewed actors reported insufficient project own financial and material sources for public space renovation and maintenance, in order to overcome this barrier they had to search for multi-source financing on the base of partnerships with the local government and local business. But for the case of Pohorelá, where the local government was initiator, it was not a problem, the total costs of the project are the highest from the investigated cases and the structure of funding was as follows: 25% PrieStory program (NGO Ekopolis foundation), 10% sponsors (local companies), 19% Slovak Environment Agency (contribution was raised by the local self-government) and nearly half of the whole amount (46%) was financed by the local self-government itself (municipality of Pohorelá).

To sum it up, the factors that were the key differences between successful and failed innovation projects in the initiative PrieStory are:

- Response of government. Supportive response from government comes more easily and naturally when the initiator is from public sector (cases of town square initiated by local self-government in Pohorelá and reading park initiated by public library in Žilina).
- Respect of citizens´ needs and feeling of ownership. The core problem mentioned by the PrieStory representatives is the fact that many public spaces renovated with the aim to increase equity (targeted on specific needs of different social groups, like family centers for mothers with small children) become after short time out of use and deteriorated
- Adequate promotion of public space (innovation). This factor plays crucial role not only in the dissemination of the project results but adequate promotion should be also in preparation phase to involve as many citizens into to co-creation process as possible, to include several social groups and respect the needs of citizens better.

Generally, the government support of co-creation in investigated cases that were initiated by NGOs in Slovakia was very low or missing. The general reason might by in what Mulgan [15] states: social innovators generally find governments unresponsive. Other set of arguments is provided by LIPSE report [28] that provides an overview of the influential contextual characteristics. The data indicate that the different countries show a number of important differences when it comes to a tradition of citizen incorporation. Some administrative traditions are characterized by a decentralized state structure and a tradition of civil involvement in public service delivery (Denmark and the Netherlands). The development towards co-creation and social innovation can, therefore, adapt more easily to the institutional context than in more centralized countries. In other countries, the tradition of collaboration with citizens is characterized by differences between domains or geographical areas (Germany and Spain). In the Eastern European states (Estonia and Slovakia), it has been shown that social innovation and co-creation are now slowly becoming part of public policy. Due to an aristocratic and/or communist tradition, policy development and implementation is still predominantly in the hands of the central governments, which makes the breeding ground for social innovation less fertile than in countries where there is a long(er) tradition of shared policy-making.

But there are also good practical reasons for public sectors to be cautious about innovation. Innovation must involve failure, and the appetite for failure is bound to be limited in very accountable organizations or where peoples' lives depend on reliability (for example, around traffic light systems, or delivery of welfare payments). Innovation also costs money and although local governments in Slovakia are financially vital [9], investing public funding into innovations is scarce.

For this reasons, improved service delivery from public institutions and NGOs usually occurs via incremental improvements to existing models rather than via the invention of entirely

new ones. But on the other hand, the government response should be supportive as Pol and Ville [19] concludes: the danger of government failure should not be overlooked.

4 Conclusion

As all our information indicates, positive examples of co-creation initiated by public servants (e.g. Regional public library in Žilina, Local government Pohorelá) are very rare. Also the evaluation reports of projects in program PrieStory (Ekopolis, 2005-2011) state that all successful co-creation projects (with still "alive" public spaces) were realized without active participation of local self-governments. The initiative comes mostly from active community groups (Rajec and many others form the 21 analyzed cases.). Indeed, they are local volunteers that are "best experts" to know concrete needs of their area and NGO, especially civic associations where the citizens and volunteers group and express their needs [25, 26]. We can see that grassroots organizations and active citizens have a strong interest in social innovation.

The program PrieStory indicated several problems. Most municipalities that were originally involved, stopped to support local initiatives during the project. Missing or insufficient support of co-creation initiatives is the reason why the co-creation activities do not increase the trust in responsiveness of government to the citizen's needs and in delivering services according to citizens´ needs (as reported by program managers form Ekopolis NGO and approved by experiences in several cases. However there are also exceptions, in already mentioned cases of local self-government Pohorelá and public library in Žilina. On the other hand, interviewed representatives from the library in Žilina stated that their positive example of co-creation initiative in public service delivery is not followed by other public organizations in the area because public servants do nothing beyond their workload.

To conclude the findings of our analysis, the role of the innovation initiator is one of the key factors influencing success or failure of an innovation and it is very vital if local government is the initiator in cooperation with NGOs and includes citizens into co-creation process. Yet, such cases are rare, the attitudes of local governments to any co-creation initiative are neutral (no support) or even negative due to the overloaded schedules of public servants, fear of failure or perceiving NGOs and civil sector as a threat (demonopolization of public services and alternative service arrangements with NGO as service producer were reported as a threat by several interviewees). Initiator of innovation and government response were two of the key differences between successful and failed innovations in the PrieStory program, the others that accounted for failure were inadequate promotion and lack of respect for citizens´ needs which led into insufficient feeling of ownership. For the future projects of similar character we would recommend better planning on involving the citizens, better promotion in all phases of the projects and securing the support of government, e.g. via dialogues or by making the local government or some public sector organization a partner in the co-creation (co-initiator of the social innovation).

It is very difficult to obtain data that speak about failures, in this case about failed social innovations. Any change is bound to create some winners and losers and the same applies for social innovations in public services where it gives a very negative image to local government if they are seen to be on the losing side. The future research in this area should thus focus on finding the links between outcomes of co-creation and influential factor and propose such suggestions that minimize the risk of failure.

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Evaluation of Ministerial Employee Satisfaction within the Context of the Civil Service Act

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Abstract

The paper presents the results of empirical research (April-June 2013) regarding the employees of ministries in the Czech Republic (N = 1351 respondents) who deal with analytical, conceptual, strategic, planning, project, programming, strategic and managerial activities. From the current perspective, it regards workers who fall under the regime of the Civil Service Act, which came into effect on 1.1.2015. The main objective of the survey was to explore some aspects of employee satisfaction linked to performance in their position. Based on the survey results, we define the previous state which existed prior to the introduction of new legislation and discuss the possible impacts of the new legislation on employee satisfaction and on the level of the civil service as a whole.

Keywords: ministrial employee; satisfaction; Civil Service Act

JEL Classification: H11, H83

1 Introduction

In this study we examine the staff of ministries of the Czech Republic who deal with analytical, planning, conceptual, strategic and control activities. We begin with the assumption that one of the key prerequisites for the effective performance of state administration is a professionally prepared and motivated staff. The motivation of ministry employees to carry out their functions depends on working conditions. Therefore, we asked ourselves how satisfied these employees were with the working conditions at their. Satisfaction was examined in the context of the following factors: relationship with immediate supervisor, relations with their colleagues in their immediate group , the organization of working hours, interest in their work, duration of working time, job security, type of practice, professional development opportunities, remuneration and evaluation, employee benefits and advancement opportunities. Satisfaction data were collected on the basis of a questionnaire, where respondents chose from a set of options offered in the form of agreement or disagreement with the offered statements concerning reflections on the conditions for performing their work, the time required to implement tasks, opportunities for professional development, psychological demands on work performance, the impact of political interests in the performance of activities and identifying the extent to which respondents are proud of their work at the ministry.

In the Czech Republic, similar research has not been conducted as of yet. Although there are studies and research institutes that focus on examining personnel, their studies have a different subject focus. It is possible to point out, for example [2], who focus on the problem of officials and their remuneration, however. In countries with a developed civil service, it is customary that the data is obtained directly by the government. In the UK, for example, a report on the civil service is regularly published which includes remuneration, performance evaluation, but even evaluations of employee satisfaction, for example [3]. This problem is not only characteristic for data for the Czech Republic, similar problems have been pointed out in research on central government officials even in developed countries such as Australia and Canada [13].

Ideological sources for the construction of the theoretical framework include studies by [11], [7], [13], [6], [19], [12], [5], [1], that deal with policy analysis, policy capacity, working for

policy, and policy bureaucracy, as well as a paper by [4] investigating reforms in employment and welfare administration. To some extent empirical investigations do exist which focus on local administration [9], public managers [14] or on broader issues related to the reform of public administration (see e.g. [20], [17], [10], [18]).

The aim of this article is to analyze the results of a ministerial employee satisfaction survey and to examine various factors which affect the work of ministry officials. We shall also discuss the possible impacts of the newly adopted Civil Service Act on satisfaction of ministerial employees and on the level of the civil service as a whole.

The influence of the Civil Service Act (published in the Collection of Acts 01/01 2015) logically could not be included in the research. At the time the research was conducted, it was not clear whether the law would be approved by Parliament. The law, itself, was debated very hastily and in part due to being "under the threat of EU." The EU established the necessity for the implementation of this Act, as it was linked to the drawing of European subsidies [23]. Nevertheless, we consider it necessary (in the framework of the discussion) to present the framing of the results of our empirical investigation in the context of the recently passed law on civil service. The stated objectives of the new civil service law are, in fact, the de politicization of government, as well as its stabilization and professionalization.

To this end, the following measures which are incorporated in the previously mentioned law should be adhered to: the selection and appointment of key officials in government, dismissal of these leaders, systemization of service posts, defining conditions for recruitment, cataloging duties of civil servants, disciplinary responsibility of civil servants [23]. These are all factors that relate to the subject of our research.

2 Material and Methods

Data for the Czech Republic are from our own empirical research undertaken on the ministries of the Czech Republic over the period April–July 2013. The research was preceded by interviews with a group of about twenty employees from several ministries. The interviews were conducted in the autumn of 2012 - January 2013. The research was conducted within the research project of the Grant Agency of the Czech Republic P 404/12/0725

In the Czech Republic, the status of staff of the Czech ministries is provided by Act No. 2/1969 Coll., on the establishment of ministries and other central government bodies of public administration, as amended (the so-called Competence Act).

The basis for the selection of the respondents was formed by a list of potential respondents that, according to research team's specifications, was provided by the individual ministries. Respondents were selected randomly. All (or almost all) entities included in the database of individual ministries were addressed through a series of random selections. The random selection thus virtually became an exhaustive selection. Questioning took place using the following forms: for eight ministries via personal interviews (F2F, face-to-face) using a questionnaire with precisely specified questions which were either paper-based (the so-called CAPI) or assisted by a laptop (the so-called PAPI). For two ministries, interviews were conducted by filling in an online questionnaire (the so-called CAWI) without participation of the interviewer as the so-called "emergency" form for cases when it was not possible to utilize the F2F form. In one case, a combination of both methods (F2F and CAWI) was adopted. In total, 1.351 respondents were interviewed. Most questionnaires were filled out using the PAPI method (992 questionnaires), 124 questionnaires were answered using the CAPI form and 235 questionnaires were completed using the CAWI method. The research was conducted over the period April – June 2013. The sample of respondents can be considered statistically significant at the 95% confidence level.

Given the extent of the participation, we are reporting the results aggregated for all ministries. We also aggregated the shares of respondents, who answered by selecting "yes" and "probably yes".

Other methods were also utilized beyond the actual survey, in particular an analysis of technical documents, comparison, induction and deduction, which found applications in the section devoted to the discussion.

2.1 Basic Information regarding the Examined Sample of Officials

The sample of respondents was 50% male and 50% female. The median age of the employees is 42 years. 88% of the employees are university graduates, 44% of employees have been working in the current position from 0-3 years, 25% of workers 4-5 years, 18% of workers 6-10 years, 13% of workers 11 years or more.

3 Results and Discussion

3.1 Evaluation of Working Conditions at the Ministry

Evaluation of working conditions at the ministry are presented in the following chart:

Figure 1. What percentage of respondents (out of the total group) for the given aspects of satisfaction at work reported that they were definitely or partially satisfied?
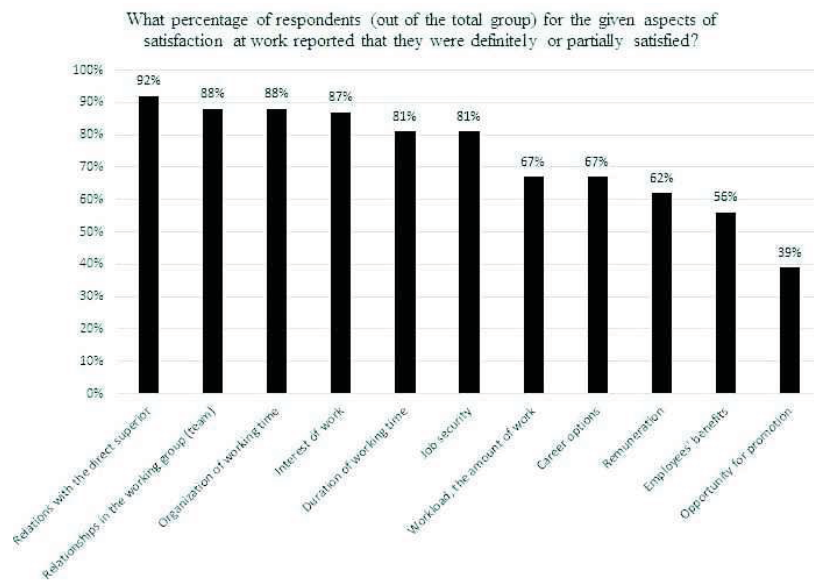
Source: Authors

Almost all of the respondents from the ministerial staff are satisfied with the relationship with their immediate supervisor and working team, the organization of working time and interest in their work. Most employees are satisfied with the length of working hours and job security. $^2/_3$ of respondents reported that they are satisfied with the workload, and professional development opportunities. The lowest satisfaction levels were seen regarding employee benefits and advancement possibilities.

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Evaluation of satisfaction with the conditions at the given position are presented in the following graph:

Figure 2. Which percent of respondents definitely or partially agree with the following statements?
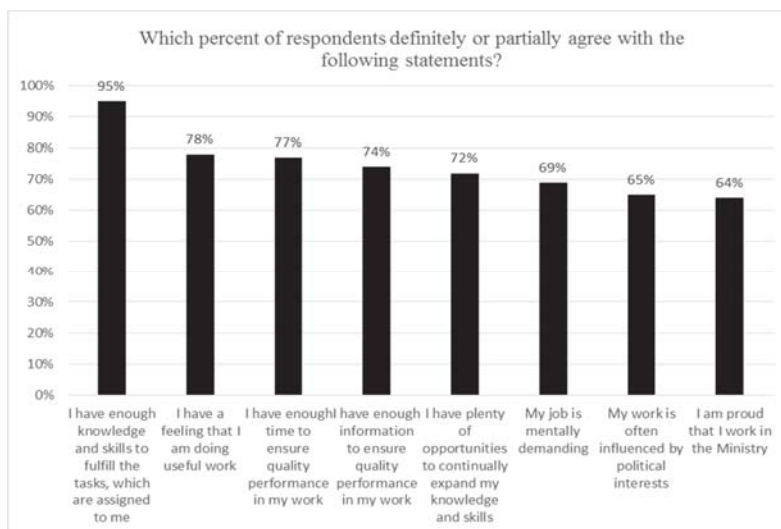
Nearly all respondents agree that they have enough knowledge and skills to perform their work. ¾ of the respondents agree that they feel that they are doing useful work, have enough time for carrying out their work, have enough information for quality performance in their work. 72% of respondents said they have ample opportunity to continually expand their knowledge and skills. The work of employees of ministries is complicated by the mental demands of the work (70% of respondents agree that their work is mentally challenging), and almost 2/3 of employees agreed with the statement that their work is often influenced by political interests. If we look at the answer to this question in more detail, we find that only 12% of respondents responded "definitely", and the opposite answer, "definitely not" was selected by 23% of respondents.

3.3 Discussion

As we mentioned in the introduction, the main objective of the new legislation is the de politicization, stabilization and professionalization of the state administration. Our survey shows that 81% of employees of ministries are satisfied with their job security, 95% of employees agree with the statement that they have enough knowledge and skills to handle the tasks which are assigned to them. As unsatisfactory appears to be the current state of the sphere of the influence of politics in the current sphere does, however, appear to have higher degrees of dissatisfaction. If we compare the results of our survey with the results of similar surveys carried out in the UK [3] it shows that Czech ministerial employees have greater satisfaction with their working conditions and workplace relations. This result can be interpreted in that the system in the UK puts more emphasis on performance evaluation, as a result, officials are under

more pressure than in the Czech Republic. The respondents feel equally dissatisfied with remuneration. Czech officials, unlike their British counterparts, also lack the perspective of career development.

The first results of the efforts at de-politicization, however, brought more of a transformation of political nominee in professional deputies. At this point it is also necessary to mention the classical arguments against excessive pressure on de-politicization of public administration, and the risk that officials will become policy makers without real legitimacy, but because of the pressure on efficiency are accepted as policy makers [8]. Officials firmly anchored in the framework of a few transparent systems of public administration are one of the main causes why politicians have failed to enforce their government programs. This situation had been warned about by Max Weber, who argued that too much rationality in bureaucratized society can lead to a loss of freedom [8].

If we look at other instruments of the law in detail, we can state that it is heading towards fulfilling the aim of stabilizing government. This concept of civil service returns to the synthesis of the Neo-Weberian bureaucracy model and Good Governance [16], [22] but without the emphasis on innovation and efficiency, which are characteristic of this model.

The Act also significantly reduces the possibility of providing bonuses. Currently they can only be at 25% of the employee's annual income, which brings us closer to the system, which is unique to the UK. In the UK, the conditions for the granting of performance related pay are fixed [15], [21]. Under current practice, the Czech Republic offered bonuses as a way to top-up salaries so that the public administration could be a competitive employer.

We see the problem as primarily the state not having a sufficient understanding of their employees, not acting upon survey data of a similar nature and not publishing data. On that basis, it is unable to form effective public policy in this area. A comprehensive answer to the question of how the law on civil service is contributing to employee satisfaction will reveal itself only with time. So far, the legislation for implementation has not been adapted which would regulate the implementation of the civil service law, including legislation which would address the system of remuneration and promotion of ministerial employees of the Czech Republic. It just shows that the law on the state was accepted quickly and chaotically.

4 Conclusion

The article presents the results of an empirical survey of satisfaction with working conditions among employees of ministries, which according to new legislation will be included in the category of civil service. The results of this analysis confronts the objectives of the new Civil Service Act.

Although the new law, in the spirit of current trends, indicates a tendency towards the synthesis of neo-Weberian bureaucracy and the model of good governance, it does not contain the elements of innovation and performance improvement. It represents rather a stabilization and encapsulation of the current system.

As part of the discussions that accompanied the preparation of the Act, there had been too much focus on the de-politicization of the ministries. Other equally important factors that affect the performance of the state administration were unjustly pushed into the background, such as career plans for senior employees, which is one of the key tools of personnel management.

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Impact of Decentralization on the Efficiency of Public Procurement. The Case of the Czech Republic

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Abstract

The article examines the impact of decentralization factors on the efficiency of public procurement. We analyzed the influence of these factors using an econometric model applied to data on public procurement purchases of gas for the years 2013-2014. In the context of the available data, this tender procedure is with a relatively homogeneous subject of performance, which significantly eliminates the possible distortion of the results due to various quality parameters of the required performance and different methods for determining the estimated value of public contracts. The research conclusions which have been reached are important, partly for the considerations of the possible centralization vs. decentralization of purchases, but they also represent a valuable contribution to the empirical investigation of the decentralized production of public goods and services.

1 Introduction

The size of the public procurement market in the Czech Republic in 2013 was around 493 billion CZK, from which roughly 60% of the funds were allocated through direct procedures according to the law, and the remaining 40% was allocated through small scale public contracts, or by using exceptions defined in the law. According to estimates, there was an increase in the volume of public procurement market to 577 billion CZK in 2014, out of which78% of the funds were allocated through the Act on Public Contracts. Public procurement is therefore an important tool of fiscal policy, and thereby considerable attention is paid to increasing its efficiency and transparency.

In the Czech Republic we can divide the lines of research into several branches. First are the studies on the theory of contracting, i.e. which services and public goods should be contracted, and under what circumstances [12], [13]. For constructing econometric studies examining the impact of the openness of the selection process, the number of bids, evaluation criteria and other factors on the difference of the expected value and the value actually tendered, we can point to [20], [24], [25]. Their findings confirm the argument that the more open procurement process is and greater the competitive effect is, and ultimately the greater difference between the predicted and actual tendered price will be. Another part of the study examines the impact of these effects in procurement within individual sectors e.g. hospitals [8] and construction [24].

Another group of authors deals with procurement in terms of transparency [19], [7], [9], [6]. Additionally, with regards to transparency related to the effects of changes in the law on public procurement, for example, there is [4], [25]. Scientific inquiries have also focused on international comparisons of various aspects of public procurement e.g. of competition, with the most often being comparisons with Slovakia [15], [18], [26], [5] or post-communist states [24]. Very few, however, deal with post-contractual behavior [26], [28]. This fact is mainly due to the need for manual data collection. In our literature review, we found only two works that at least marginally mention the impact of decentralization on public procurement in the context of post-contractual behavior: [26] was already mentioned, and as an additional article, we can mention

[28]. In this case, however, it is not scientific literature, but rather a professional journal for a municipality.

Theoretical approaches to the problem of decentralization are based on Oates' Decentralization Theorem [21], [22], Ideas of Fiscal Federalism [32], [11] and the Theory of Fiscal Federalism. "Decentralization ... is generally desirable from the viewpoint of efficiency and local accountability. These criteria must be balanced with other elements, such as spatial externalities, economies of scale, overall fiscal efficiency, regional equity, redistributive responsibilities of the government"[1]. Self-government fiscal units can make effective decisions [20]. For it they can use either information asymmetry [2], regulatory tools [29], selecting the appropriate organizational form for the allocation of resources [14] or to search for other decentralization factors which influence the efficiency of the allocation of resources.

In our approach we also consider the term local accountability to be significant, which can be interpreted so that the accountability of politicians to the electorate will increase with decentralization, which, in our opinion, may be reflected in public procurement. Voters at the local level will be less willing to tolerate overpriced contracts.

Evaluations of the effectiveness of public procurement at various levels of the public sector has not yet been a focal point of mainstream research. The aim of this article is therefore to use an econometric model which has been applied to data regarding the procurement of gas purchases in 2013 and 2014 and to quantify and explain the differences in the effectiveness of public procurement among the different levels of government, i.e. among the central government, regions and municipalities and based on these results, contribute to the discussion about the possible centralization of public procurement.

2 Material and Methods

The ordinary least squares (OLS regression) method was utilized for our model. Our model was tested in order to fulfil the Gauss – Markov assumption. The regressors were exogenous and there was no perfect multicolienarity. The errors are homoscedastic and serially uncorrelated.

2.1 Data

A subject of interest is data on the procurement of gas supplies (CPV code 09123000-7), whose announcement was in the Bulletin of Public Procurement published in 2013 and 2014. Of these contracts, or parts of contracts (of which there were 397 awarded in the reporting period) 120 public contracts were randomly selected, which were tracked on individual profiles of contracting authorities regarding the tendered unit price of gas as well as the estimated quantity demanded. Contracts for the supply of natural gas were chosen because they are a homogeneous subject of fulfillment, where the unit price is not influenced by the quality or technical requirements on the subject of fulfillment, which should significantly reduce the possible bias of the model results due to various parameters of the required fulfillment as well as different ways of determining the estimated value of the public contracts. At the same time, contracts with this subject are awarded according to law in sufficient quantities for the different types of contracting bodies.

2.2 Depend Variable

Listed gas price (CZK without VAT per MWh) is the explained variable in this model. This is the price for gas supplied without regulated components of the price determined by the Energy Regulatory Office. In some contracts this price is also determined separately for retail customers (up to 630 MWh per place of consumption per year) and wholesale customers (or is still priced separately for middle-consumption). For such contracts or parts of contracts, where

more sub prices were set, the average price was calculated (weighted average according to the expected amount). In the case of the analysed data to the average unit price of gas corresponded to a value of CZK 705.4 / MWh (minimum value CZK 614 / MWh, maximum 784.9 CZK / MWh).

2.3 Explanatory Variables

Contracting Authority

Similarly as in the previous econometric model and here as well, dummy variables act as explanatory variables indicating whether the contracting authority is the state, a region or a municipality. Unlike the previous case, the categorization is not according to the Bulletin of Public Procurement, which exhibits some errors, but instead, the authorities were manually sorted into appropriate groups. Municipalities and regions, associations of municipalities or regional organizations for central procurement have also been placed alongside them. The following table presents basic information about the explanatory variable Contracting Authority:

Table 1. Explanatory variable Contracting Authority

Type of Contracting Authority	Occurrences in the Sample	As a Percentage of the Total
State	18	15.00%
Region	14	11.67%
Municipality	73	60.83%
Other	15	12.50%
Total	120	100.00%

Source: Authors

Type of Award Procedure

Another explanatory variable is the type of procedure according to the law. The possibility of using a negotiated procedure without publication pursuant to § 23 paragraph 5 point c) of the Public Procurement Act, for contracts awarded on commodity exchanges is specific to the case of contracts for the purchase of gas (or commodities in general) . For these contracts, there are competing bid prices, however, some data (such as the number of bidders) is not available. The following table presents basic information about the explanatory variable: Type of Award Procedure.

Table 2. Explanatory variable Type of Award Procedure

Type of Award Procedure	Occurrences in the Sample	As a Percentage of the Total
Open	43	35.83 %
Narrowed	1	0.83 %
Negotiated procedure without publication	61	50.83 %
Simplified sub-limit procedure	15	12.50 %
Total	120	100.00 %

Source: Authors

Variables Indicating the Size of the Public Procurement

As an additional explanatory variable for which anticipate the possible impact on the price achieved per unit of natural gas. Additionally, we consider some of the variables expressing the volume of the public contracts suitable as response variables regarding the anticipation of the possible impact on the achieved price of gas. They could be the anticipated volume of gas purchased or the estimated value of the public contract. According to the analysed data, the average volume demanded in a public contract, or in the relevant parts of the procurement amounted to 27 821.77 MWh and the anticipated value had an average of 28 835 538CZK. The

following chart presents a comparison of the average volume demanded according to contracting body:

Figure 1. Comparison of the average volume demanded according to contracting authority
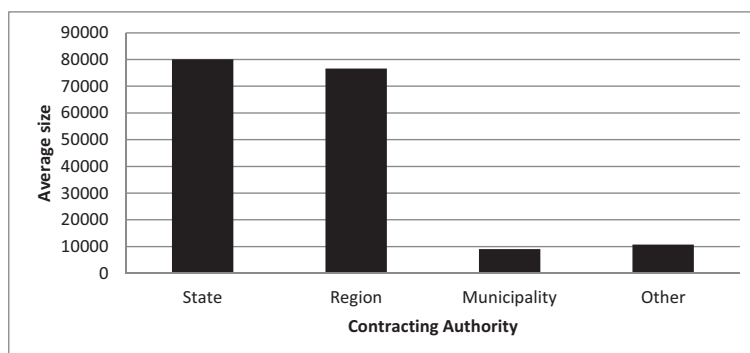
3   Results and Discussion

The following chart presents a comparison of the average unit prices according to contracting authority.

Figure 2. Comparison of the average unit prices according to contracting authority
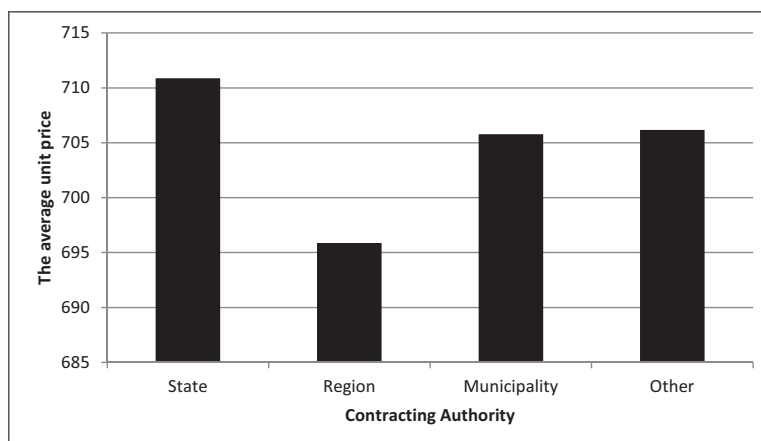
According to the preliminary inspection of the graphical data, it is clear that there are differences among the various levels of the contracting bodies, the lowest unit prices were seen from the contracting bodies at the regional level, followed by the municipalities and finally, the central government. In order to clarify these conclusions, we used an econometric analysis.

Table 3. Model for depend variable Price per unit

	Coefficient	Std. Error	t-ratio	p-value
Const	731.174	6.16558	118.5896	<0.00001
Stat	12.1998	6.38155	1.9117	0.05842
number of units	−8.90577e-05	3.83627e-05	-2.3215	0.02204
Delivery 2015	−15.4152	4.30963	-3.5769	0.00051
Open tender process	−16.5914	6.70012	-2.4763	0.01474
Negotiated procedure without publication	−19.4764	6.54078	-2.9777	0.00355

Source: Authors

Table 4. Model for depend variable Price per unit

Mean dependent variable	705.4312	S.D. dependent var	25.23322
Sum squared resid	58629.42	S.E. of regression	22.67803
R-squared	0.226210	Adjusted R-squared	0.192271
F(5, 114)	6.665345	P-value(F)	0.000018
Log-likelihood	−541.7626	Akaike criterion	1095.525
Schwarz criterion	1112.250	Hannan-Quinn	1102.317

Source: Authors

Our model demonstrates a relatively strong variability in gas prices. Andditionally, it confirms the initial assumption that when the central government is the sponsor, the unit prices are higher. The influence of the contracting body at the level of municipalities and regions is approximately the same. The number of units demanded and the estimated value have the same effect on the unit price, indicating a lower unit price for large orders (volume discounts).

When searching for the causes of this situation, we must consider the fact that the awarding of public contracts affects the result of many often contradictory phenomena. Our model, even when compared with other previously published models achieves a high coefficient of determination, and does not cover the whole behaviour of the variability of the final price. Therefore, by the relatively good results of regions compared with other levels of government, we can explain the optimal level of decentralization towards the accountability of responsible officials, efficient allocation and also the optimum range of economies of scale. Regarding the example of purchasing gas we demonstrated that the size of the contract has a significant impact on the achieved price, while the size of the contract depends on the type of client. In theory, the economies of scale should have a U-shaped curve. We can therefore assume that when regions are the sponsor, we will have reached the peak. A shift at the level of government, either above or below, will mean a reduction in the value of economies of scale. In the case of the transition to a higher level, we must also take into consideration the increased costs of the coordination and harmonization of requirements for all entities. On the other hand, move down one level, i.e.at the level of municipalities, and this represents greater heterogeneity on the part of the suppliers, while awarding various sizes of contracts from small to large. The potential for achieving economies of scale is smaller. This fact is confirmed by inspection of the data, since the contracting authorities have often been associations of smaller municipalities. Diseconomies of scale, however, compensate with higher accountability within the municipalities.

The example of buying electricity was dealt with in a similar manner in a study [29], but a statistically significant correlation between the final price and the type of contracting authority was not identified. Assessing the effectiveness of the management of hospitals in Slovakia regarding this topic was dealt with by [17]. Hospitals run by municipalities have a lower trend in the growth of debt than the hospitals established by the state. The quality of care, however, according to the authors' opinion, is not influenced by the type of property.

We believe that a centralization of public procurement, e.g. in the form of the creation of a special office which would be responsible for ensuring the provision of its acquisition of certain services or commodities, may not always achieve higher savings.

4 Conclusion

Analyzing the problem of efficiency of public procurement in the context of the idea of decentralization has shown that this is a neglected problem in contemporary economic theory. The study confirms that Oates' general conclusion about self-government units, which can make effective decisions, applies to the field of public procurement.

Another factor identified which influences the efficiency of public procurement is the economies of scale. In theory it should work that the greatest economies of scale would be achieved by the central government. The findings show, however, that in the case of public procurement it does not automatically work that centralized buying leads to higher savings. The consequence we denote as "depreciating effects of centralized procurement." We understand them as additional cost implications due to the need for coordinating bodies.

In conclusion, the problem of efficiency and decentralization of public procurement is affected by many factors, not only by the technical efficiency of public procurement, but even by by the current state of legislation, by the controlling bodies and by the ethical values in society [16].Further scientific analysis and discussion about them can lead to increased efficiency in public procurement. This study is a contribution to launching a debate on this issue.

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Offer, Receive and Share: How to Measure Proposers in fMRI Ultimatum and Dictator Game

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Abstract

Ultimatum game is in fMRI tested overwhelmingly from the responder´s point of view. We assessed experimental designs which would allow for simultaneous testing of a proposer and a receiver under hyperscanning protocol. Our final laboratory designs use a specific set of choice sets and enables an iterated ultimatum game combined with control condition and dictator game. We run two pilots with different settings. Our results show substantially higher amount of unfair choices in the pilot II compared to pilot I. Empathy as measured by IRI questionnaire can be considered an influential predictor of behavior during experiment.

1   Introduction

As soon as functional magnetic resonance imaging (fMRI) scanners became available for research, analysis of ultimatum game (UG) and dictator game (DG) behavior became a common tool for economists and neurologists who studied emotional and cognitive reasoning. In the UG [24] and DG [6] games one player acts as a proposer and another acts as a responder. The proposer is given a sum of money and has to offer the responder a non-negative portion of money. The difference between UG and DG is whether the responder has the right to reject proposer´s offer. In the UG, the responder can either accept how the money was split, in which case both players receive the amount proposed, or has the possibility to reject it, in which case neither player receives any money at all. In the DG, refusal is not available to responder, and the proposer made allocation is always accepted.

According to the classical economic theory [27, 30], Nash equilibrium (and Pareto optimal allocation) is in proposer offering zero in the DG and the smallest possible amount in the UG, followed by responder´s acceptance, which maximizes expected payoff. Before fMRI, the UG and DG were studied in experimental labs, and papers written over the past decade [15, 23] show that subjects behave differently than model predicts, with allocations more generous to responder. In the DG, amount kept by the proposer depends on norms [25], social distance [16] or specific rules [37], but usually receiver does not end up with zero. In the UG the reasons for proposed split are similar to the DG and may also depend on stakes [1], affective states [36] and social preferences of the proposer [12]. Generally, rejection rate rises to a half when proposers allocate less than 30% of the money to the responder, which may be the reason why typical splits in the UG are between 30 – 50% of the whole sum.

There are several ways to address discrepancy between low expected offers and high observed offers in the UG. Reasons for rejections may be an angry reaction to a split perceived as unfair [10], punishment of an undeserving party [5], or that participants seek to build their reputation [31]. FMRI research allowed focusing on activity of specific brain regions during making the decisions. Notably anterior insula activation was observed in response to unfair offers [33], amygdala activation for rejection decision [20] and DLPFC activation for strategic behavior [28]. These fMRI studies were methodologically based almost solely on the experience

of a responder, who typically reacts to offers presented on screen and is told those are offers of a real person. The offers were however created by experimenters, who wanted to ensure participants answered to all kinds of splits (typically fair and unfair offers). This limits validity of methods, as participants perceive at best large distance between them and another player. Proposer role is also covered only rarely, as far as we know the only article with participants as proposers was Zheng, Zhu [38].

Factor, which made Levitt and List [26] question validity of experimental research, was the prevalence of one shot games. Subjects may moderate their DG and UG behavior according to their real-life experience, but as authors say, "social dilemmas are typically not one-time encounters, but rather repeated games". According to meta-analyses done on literature [29, 17, 11] an overwhelming majority of studies (fMRI or non fMRI) uses some variant of non-repeated game to study behavior in the UG and DG. In the DG, repeated game has little added value due to proposer having no reason to change her mind, unless there is an intervention. FMRI experiments, which need repetitions in order to measure activations of brain areas correctly, attempted to create workarounds, such as participants responding to simulated offers of several different proposers [21]. In the UG strategic calculation changes when the game becomes iterated, as the responder might in the long run benefit from rejecting unfair offers and thus forcing proposers to offer better allocations. The studies on repeated ultimatum game [34, 3] observe that behavior converges toward equal sharing after a first few rounds. This is theoretically supported by Gale [18], who modeled a difference between equilibrium in infinitely repeated UG and subgame perfect UG equilibrium.

FMRI scanning also requires repetition of tasks. Yet standard iterated UG does not fulfill the criteria, as typically UG proposers opt for fair splits with responders, who overwhelmingly accept, leaving experimenters with only a part of desired data. A task which does not change also means participants have no need to think and reevaluate their strategy. Hence we see a need for an experimental design which can test prosocial and strategic behavior in fMRI. This need was so far only partially filled with choice sets introduced in Zheng, Zhu [38] for the UG. A new field for fMRI research would open if it was possible to create a protocol for UG which would involve the following: (1) participants in the role of proposers and receivers, (2) proposers offering fair and unfair splits, (3) responders accepting and rejecting offers.

An additional benefit in having a functional protocol for the UG might be its combination with the DG. A substantial body of literature focuses on the difference between cognitive empathy (CE) and affective empathy (AE) [14, 8]. Those concepts are also related to notions of pro-social behavior [32] and strategic thinking. One of the important measures to assess different levels of AE and CE is in difference between behavior in the UG and DG [4, 7] with conclusion that CE and AE has an influence on proposer´s performance in the UG (pro social behavior and strategic thinking), while AE would influence proposer´s behavior in the DG (pro social behavior only).

We aimed to create design that would allow researchers to reliably measure differences between behavior in the UG and behavior in the DG in fMRI. During the process we found many limitations given by fMRI that substantially influenced the final experimental design. Since the topic was not yet addressed by the Czech scientific community, this paper aims to familiarize the reader with main limitations given by fMRI for experimental design. We also describe results of two pilot test variants of fMRI modified design.

2   Material and Methods

We had several limitations throughout both pilots. Scanner fits only 2 people and it takes a long time to transfer between scans, so it is necessary to create a design for an unchanging pair of two people. In a neuroeconomic experiments the subject is lying in a scanner and cannot move, since even a few millimeters of head movements make data complicated to use. Therefore, our design uses only two keyboard buttons to minimize subject's movement.

We put the UG before DG. In the beginning of the experiment subjects read rules of the UG. Participants were told that during the experiment there will be a change of rules, but they didn't know what kind of change it will be. At the alteration from the UG to the DG the rules were explained fully. The pairs and roles of proposer and receiver remained constant during the whole experiment to keep strategic thinking only in the UG, without spillovers from potential DG – UG influence. Participants were told an approximate timing of the experiment, but did not know an exact number of rounds.

The needs of limited movement led us to implement a design with only two possible options of money allocation for the UG and the DG, "choice-sets", instead of a proposer having a full range of numbers to choose from. For example, proposer can choose between division of money where 50CZK goes to her and 50CZK to the receiver or she can pick the allocation where 60CZK is paid to her and 40CZK is paid to the receiver. The situation as presented to the proposer during the experiment is illustrated on the figure below:

Figure 1. An example of choice-set presented to proposer
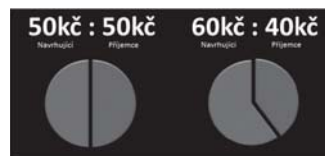
Source: Authors

Identical screen with both choice-sets was presented also to the receiver. After the proposer marked her choice, the unselected split disappeared. In UG receiver then decided whether to accept or reject. Her choice was displayed to the participants by green tick (acceptance) or red cross (rejection). In DG, receiver only observed the choice of proposer, but could not accept or reject – all proposals were automatically accepted.

2.1 Reward

Experiment lasted for approximately 90 minutes, and participants were told their reward will be approximately 200 CZK (10 Euro). At the end of the experiment we randomly picked 4 rounds (2 from the UG and 2 from the DG) that determined participant´s final reward. The final reward oscillated between 200 and 350 CZK.

2.2 Pilot I

Procedure

We created 6 different choice-sets, each appearing 5 times in a mixed order during the UG and then again 5 times during the DG. The choice-sets in the UG and DG were sorted in the same order making the results comparable. The choice-sets were 70:30 vs. 90:10; 70:30 vs. 80:20; 60:40 vs. 80:20; 60:40 vs. 70:30; 50:50 vs. 60:40; 50:50 vs. 70:30, with first number being proposer´s share. We classified the more equal allocation as fair offer, and an allocation with higher share to proposer as an unfair offer.

We opted for 30 repetitions for each condition after assessing how many repetitions are necessary to capture satisfactory results in magnetic scanners. Altogether, the players did 30 rounds of UG and 30 rounds of DG. In each round 3 seconds were assigned strictly to observing the choice-sets (or the proposed offer) and during the remaining 5 seconds the participants had to choose. Final outcome of each round was displayed for 4 seconds, and the round lasted 20 seconds in total. If either of participants did not mark an answer during the time limit, both participants won 0CZK in the given round. Such an exact timing was necessary in order to limit

the time when subjects make the choice, allowing the fMRI scanner to measure at the decision moment.

2.3 Pilot II

Procedure

In the second pilot, we added a new category of choice-sets. In pilot 1, we had only choice-sets such as 6:4 vs. 7:3, where both allocations were in favor of the proposer ("me-me"). Choice-sets me-me in pilot 2 were 70:30 vs. 60:40; 60:40 vs. 55:45; 65:35 vs. 60:40; 70:30 55:45 and 65:35 vs. 55:45. In the new category of choice-sets the proposer decides whether to pick choice-set in her favor or the choice set in favor of the receiver ("me-you"). Choice-sets from this category were 60:40 vs. 40:60; 65:35 vs. 45:55; 70:30 vs. 30:70; 55:45 vs. 45:55 and 65:35 vs. 35:65. In the me-me choice sets, we classified the more equal allocation as a fair offer, and an allocation with higher share to proposer as an unfair offer. In the me-you choice sets, we classified an allocation with a higher share to proposer as an unfair offer, and an allocation with a higher share to responder as a fair offer. Each choice-set was repeated 6x for UG and 3x for DG.

In order to increase the absolute amount of unfair offers and rejections to fMRI measurable level, we run 60 rounds of UG and 30 rounds of DG. The pilot was carried out in two blocks. For the second block we added a control condition with 30 rounds of choice between two colored circles. The circles had no influence on final payoffs and participants were informed about it. This allows to distinguish between brain activations related to decision-making related to the game and between processes necessary for carrying out the choice (such as pressing the button).

The times for decisions in each round were shortened to 3 seconds for observing the choice-sets (or proposal) and 3 seconds for making the choice.

2.4 Empathy Measurement

In order to test the hypothesis about relationship between empathy and the UG and DG behavior, we scored our participants in both pilots in Interpersonal Reactivity Index (IRI) [2]. IRI is a classic test applied in psychology that has been extensively investigated and validated [19]. It contains 28 questions that measures following areas of empathy: The perspective taking (PT) scale measures the reported tendency to spontaneously adopt the psychological point of view of others in everyday life. The empathic concern (EC) scale assesses the tendency to experience feelings of sympathy and compassion for unfortunate others. The personal distress (PD) scale taps the tendency to experience distress and discomfort in response to extreme distress in others. The fantasy (FS) scale measures the tendency to imaginatively transpose oneself into fictional situations[9].

3   Results and Discussion

In the pilot 1 participated 24 subjects (9 female and 15 male). In the pilot 2 participated 42 subjects (30 female, 12 male). We used ORSEE database [22] to select the participants. All subjects were undergraduate students.

For both pilots we measured ratios of unfair offers in the UG and the DG and their correlations. Each participant also filled IRI, and we measured how it relates to behavioral results. We also measured Equal Distribution Distance (EDD), which shows how much proposers tend to pick choices that favor themselves. The higher the number is, the more unequal the choices were in favor of the proposer. The maximum possible amount (i.e. 100%) was 1740 for the second pilot. Zero means equal distribution of income between the proposer and receiver across all rounds of the UG or DG. Value Missed describes percentage of rounds where participant with a power to change the round outcome (everyone except responder in dictator

game) failed to make a choice. Expected Monetary Payoff displays how much would participants earn, if they were paid for all their rounds, and divided by number of rounds.

Table 1. Results of pilots

Type of Game	Unfair offers (%)	Rejections fair offers (%)	Rejections unfair offers (%)	Missed (%)(bracketed are misses of unfair offers	Expected Monetary Payoff Proposer per round	Expected Monetary Payoff Receiver per round
UG pilot 1	13,1	5,9	59,6	2,5 (0)	62,0	38,0
DG pilot 1	67,8	-	-	0	70,3	29,7
UG pilot 2 (all)	41,7	1,5	19,4	3,6 (4,6)	56,7	42,7
UG pilot 2 (me-me)	14,6	2,1	16,3	2,4 (3,3)	58,1	41,5
UG pilot 2 (me-you)	68,9	0	20	4,8 (2,1)	55,3	43,9
DG pilot 2 (all)	75,9	-	-	0	61,3	38,0
DG pilot 2 (me-me)	63,5	-	-	0	62,5	36,9
DG pilot 2 (me-you)	88,3	-	-	0	60,2	39,2

Source: Authors

Table 2. Equal Distribution Distance

	EDD DG	EDD UG	EDD UG - DG change	EDD UG and DG correlation
Pilot 1	1218,3	718,3	-500	0,365
Pilot 2	698,1	838,6	-466,2	0,700

Source: Authors

3.1 Pilot 1

In Pilot 1, we observed high amount of fair offers in the UG. Out of 304 choices made in UG, only 47 (13%) of them were unfair. Out of these unfair choices, 29 (67%) were rejected. 40% of all unfair choices in UG happened the first time choice set was presented. In the DG, with the same choice-sets, proposers made fair choices only 33% of time.

We found we had almost no unfair choices with choice-sets where one of the options was 9:1 or 8:2, and when such allocation was chosen, the proposal was rejected. Interestingly, some receivers decided to reject even the fairer option in highly unequal choice-sets (such 7:3 vs. 9:1 or 7:3 vs. 8:2). One receiver for example rejected all 5 offers of division 7:3, even though the choice-set was 7:3 vs. 9:1. This suggests a high level of inequality aversion for some subjects.

Lack of unfair offers after first round in pilot 1 suggests that there was a quick learning process of proposers, which is supported even by graphs that show a decreasing amount of unfair choices across all types of choice-sets.

Also in DG we observed lower amount of unfair splits for the most unequal choice-sets. We did not find any support for the learning process as it was with the case of UG, and the amount of fair and unfair choices remained constant (and for some choice-sets even slightly increasing) during the whole DG.

We found substantially higher variability of EDD for DG compared to UG, which illustrates the following box diagram.

3.2 Pilot 2

We successfully reached the goal of pilot 2 to increase level of unfair choices, with the final level of unfair choices in the UG on 41.7%. The main credit for this result can be assigned to me-

80

you choice-sets, where the level of unfair choices reached 69%. The level of unfair choices in the category me-me remained low, only 14.6%. We did not observe the steep learning which in the pilot 1 caused proposers to stop offering unfair allocations after the first round and the number of unfair offers in pilot 2 remained stable throughout the games. We also observed substantially lower amount of rejections. Out of 526 unfair choices, only 102 were rejected, which makes rejection rate only 19% (16,34% for me-me choice-sets and 20,04% for me-you choice-sets). Compared to the rejection rate from the first pilot (62%) there has been a substantial decrease. This may be a reason for non-existing learning effect of proposers.

Comparing the EDD, we find substantial differences in variability between different types of choice-sets and conditions. The following box diagrams depicts EDD for (a) all choice-sets of the Ultimatum game (EDD1), (b)all choice-sets for the Dictator Game, (c) me-me choice-sets of the UG (EDD 3), (d) me-you choice-sets of UG (EDD4), (e) me-me choice-sets of DG (EDD5), (f) me-you choice-sets of DG (EDD6). The values are expressed in percentages counted out of maximal possible of amount of EDD for the given category.

Figure 2. Equal Distribution Distance in UG and DG in Pilot I
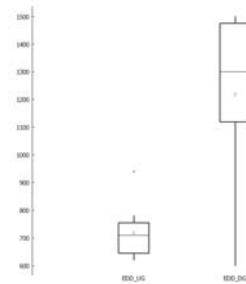
Source: Authors

Figure 3. Equal Distribution Distance in UG and DG in Pilot II
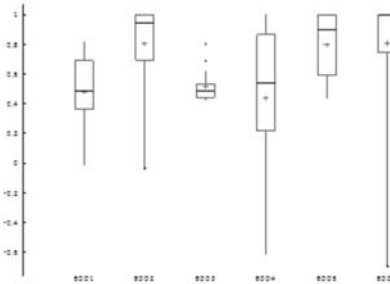
Source: Authors

3.3 Empathy

Table 3. IRI correlations with Number of Unfair Offers (Proposers)

An example of a column heading	Fantasy scale	Perspective taking scale	Empathic concern scale	Personal distress scale
Pilot 1 Unfair Offers UG	-0,23	-0,83**	-0,58**	0,30
Pilot 1 Unfair Offers DG	-0,67**	-0,65**	-0,54*	0,07
Pilot 2 Unfair Offers UG	0,079	-0,19	-0,17	-0,00
Pilot 2 Unfair Offers DG	-0,08	-0,30	-0,28	-0,51**

Source: Authors

The results of IRI (Interpersonal Reactivity Index) proved significant correlation with unfair offers in the pilot 1. Unfair offers for both UG and DG were highly negatively correlated with Perspective taking score (-0.83 for UG and -0.65 for DG). Lower, but significant correlation was found for Empathetic concern score (-0.58 for UG and -0.54 for DG). This supports our hypothesis that decision-making in UG and DG are amongst other driven by empathetic abilities. We also found significant negative correlation of Fantasy score and unfair offers in DG (-0.67).

In the pilot 2 we did not find any significant correlation of IRI and unfair offers in the UG or DG. We believe that this is partly connected with missing learning effect in the second pilot. Since there was substantially lower rejection rate (62% of rejected unfair offers in the first pilot compared to 19% rejected unfair offers in the second pilot), the dictators probably did not need to deeply involve their perspective taking abilities in order to determine whether the offer will be accepted or rejected. Yet this hypothesis does not explain missing influence of affective empathy.

4 Conclusion

Although the two experimental designs were fairly similar, we observed in some aspects substantial differences of subject's behavior between pilots. Most important of them was significantly lower rejection rate in the second pilot compared to the first pilot. One interpretation states that the proposers could allow to offer more unfair offers without a fear from rejection and they did not need to learn from behavior of the receiver.

Another point of view states that by implementing the "me-you" choice-sets, we added to the design new possible strategies. The me-you choice-sets allow proposers to make splits that over the course of an iterated game result in a more equal distribution of profits between the proposer and the receiver. Receivers behave rationally when they accept an unfair offer in the me-you choice sets, because they are rewarded by fair splits in the me-me choice-sets. Such a coordinated interaction requires empathy and understanding with the other player. We predict higher monetary payoff for those pairs comprised of individuals with high empathy score than for those with low empathy. It should be a subject to the future research which of the factors that we changed in the second pilot was the factor the caused the change.

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Appendix

Pilot I: Number of Unfair Choices across Rounds

Figure 4. UG
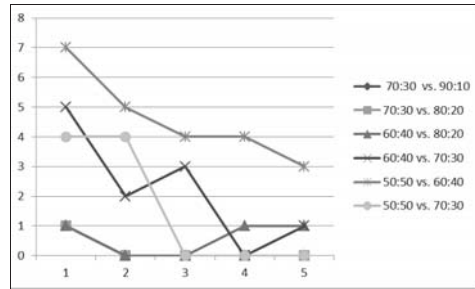
Source: Authors

Figure 5. DG
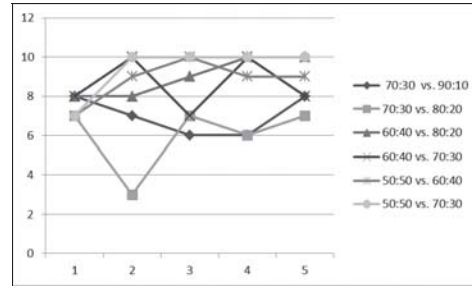
Source: Authors

Pilot II: number of unfair choices across rounds

Figure 6. UG, me-you choice-set
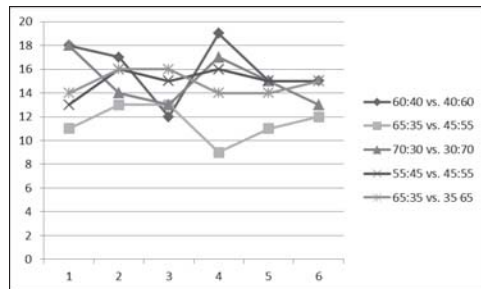
Source: Authors

Figure 7. UG, me-me choice-sets
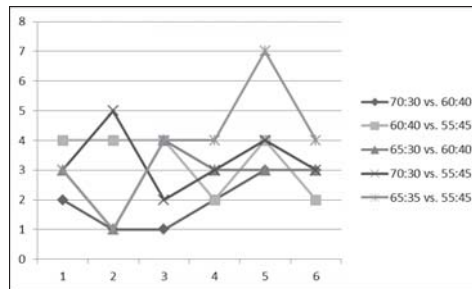
Source: Authors

Figure 8. DG, me-you choice-sets
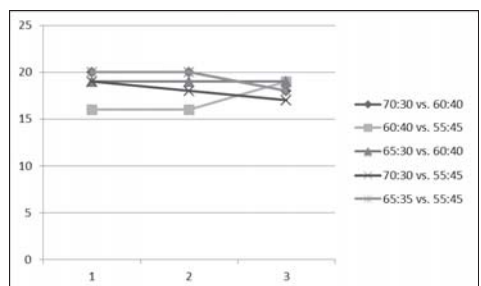
Source: Authors

Figure 9. DG, me-me choice-sets
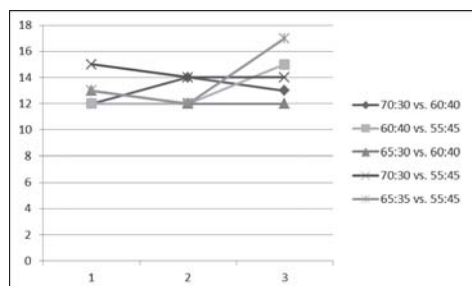
Source: Authors

Politicization of Civil Service in Slovakia:
Case Study of Selected Ministries in 2004-2014

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Abstract

Politicization of top civil service in Central and Eastern Europe has been discussed among both academics and practitioners for some time now. It has been concluded that the politicization of civil servants has resurged since the accession into the EU, which has lead to a great deal of uncertainty among civil service. Nevertheless, the evidence on turnover is mostly stemming from interviews and expert survey since CEE countries lack basic data on HR functions. This paper wants to address this gap and looks into turnover data (both scope and depth) among top civil service officials at the six Slovak ministries between 2004 and 2014. During this period, the Slovak government was completely changed three times. The work describes the connection between electoral cycles and top civil servants replacements. The research has shown that election cycles are important determinant for the replacements. Nevertheless, not only electoral cycles are important in the turnover. The paper has shown that the role of minister personality has an impact on replacements and turnover rates. Also, the research has shown the existence of "stable units" within otherwise politicized ministry where the top civil servants change only on a minimal level.

Keywords: top civil service; politicization; turnover; Slovakia; Central Europe

JEL Classification: Z18

1 Introduction

A professional civil service is the cornerstone of an effectively performing public sector. Politicization is generally seen as the primary impediment to successful administrative development [12, 9], as it runs contrary to the principles of merit, professionalism and permanence. Thus, politicization in public administration is a relatively widely researched phenomenon among both academics and practitioners. It has been a concern for some time also in Central and East European countries, particularly those which became part of the EU. In the last years prior to EU accession reforms were conducted in candidate states to bring about the formalization of politico-administrative relations and compliance with the „principles of the European Administrative Space". These principles of European administrative space were developed by the EU and SIGMA as part of the EU's attempt to develop an overall public administration reform policy which could help applicant countries to meet the Copenhagen and Madrid criteria. Generally, these reforms have progressed slowly and although measures have been introduced that would hinder the politicians to appoint and dismiss senior officials at their will in most countries [13, 4].

Thus, also the official policy documents of the EU and SIGMA OECD have focused on the CEE civil service reforms, including level and extent of politicization, for example in Progress Reports, Regular Reports, Monitoring Reports and/or Commission Opinions with country specific recommendations. All these documents and research conclude that there is a continued politicization, ongoing failure to create a professional merit based system, lack of effective measures to improve the stability of staffing and thus the resuls is high turnover due to political cycles. A similar conclusion has been reached also by academic research which shows that compared to other European countries CEE politicization levels are below the European mean and Slovakia belongs to one of the most politicized countries of the region [6,4]. Nevertheless, these are anecdotal information from interviews but no data exist on the extent of the turnover.

Therefore, the aim of this research is to show quantitatively the turnover caused by politicization (regardless of the reasons) after joining EU, in the period of 2004 – 2014.

1.1 Concept of Politicization and its Measuring

Despite the general concern about the politicization, the term has been interpreted in many different ways. Peters and Pierre [8] have provided a very useful definition where politicization is "…the substitution of political criteria for merit-based criteria in the selection, retention, promotion, rewards and disciplining of members of the public service" (p.2). That definition has been used widely and still appears to capture the central meaning of the concept [2]. However, this definition of politicization is rather broad and Peters himself has examined some alternative forms of politicization that have been implemented, such as *direct politicization, professional politicization, redundant politicization, anticipatory politicization, dual politicization* and *social politicization.* Meyer Sahling [5] looked at and differentiated politicization based on political control over top civil servants when vacancies after having inherited civil servants dismissed are being filled either from within lower ranks of the ministry (*bounded politicization*), by outsiders from non-political settings (*open politicization)* or by outsiders from political setting (*partisan politicization).* All of these formats of politicization may have a very similar effect, high turnover, nevertheless there are different structural features and manner in which politicians and civil servants work together. In Slovak context this nuances of politicization have been studied by Staroňová and Gajduschek [10].

There are various approaches how to study politicization, nevertheless each trying to capture and measure the degree of the phenomenon (its scope and depth) occurring in civil service. These approaches range from creating typologies of de jure and de facto politicization by studying formal legislation and their ratio among collective and ministerial political positions, and non-political statutory positions [7]. Another way is the use of proxies, such as adoption of civil service laws [3], growth of the number of civil servants [3, 6] or more recently the use of expert surveys among civil servants [4]. Overall, all these approaches conclude increased politicization, particularly with each electoral cycle, however it is practically impossible to determine the real degree of the phenomenon.

This paper wants to examine quantitatively the degree of the politicization (both its scope and depth) by looking at a sample of selected ministries from a longitudinal perspective in the period of 2004 – 2014. Although this method does not capture the nuances, it is possible to observe an overall trend when change of governments occurs. Thus it is not possible to determine the purpose of politically initiated and influenced HR decisions.

2 Material and Methods

Rather than assessing the politicization of top civil servants agains the many formats of politicization, this article takes a starting point of elections where the government has the choice towards the existing civil service: whether or not to terminate the inherited civil servant. The aim of the research is to show quantitatively the turnover caused by politicization (regardless of the reasons) after joining EU, in the period of 2004 – 2014. This is also the period when Civil Service Law was already passed and came to effect (2002) and thus formally restrictions on political replacements are in place. During this period we have witnessed three parliamentary elections in the years 2006, 2010 and 2012. Each elections were followed by a complete substitution of the ruling coalition, where none of the previously ruling party in the coalition did not continue in the government. Since 2012 first time in the history of Slovakia only one party became the ruling government (without any support of any other party) – that of the SMER-SD party.

The case study of Slovakia has developed an original approach towards studying turnover rates and it includes six ministries into the sample: Ministry of Education, Science, Research and

Sports (MoESR), Ministry of Transport and Regional Development (MoT), Ministry of Labour, Social Affairs and Family (MoL), Ministry of Justice (MoJ), Ministry of Economy (MoE) and Ministry of Finance (MoF). The criterion for the selection of the ministries was the usability of at least 85% of the data. Data are related to the filling of the positions on top three levels of the ministerial hierarchy. They stem from two sources: a) 25% of all data are based on internet search of publicly available archives of official web pages of the ministries (*Internet archives shows internet web pages as they existed in the past. It is available at: https://archive.org/index.php*) b) the rest of the data come from official requests by utilizing Free Access to Information Law sent to all ministries (only to the central body of the ministry, not the subordinated agencies). One year of an average sized ministry encompasses approximately 35 managerial posts within the hierarchy. We were comparing the changes in the managerial posts against the previous year (e.g. year 2005 against the year 2004, year 2006 against the year 2005, etc.).

The free access to information requests have been sent to all ministries, but only those which have provided sufficient data were included into the sample. Not always do ministries keep and archive information on their staff. In fact, due to absent central coordination it is up to a ministry which HR information is it going to collect and archive (see Figure 1).

Figure 1. HR Information Collected by Individual Service Offices of Ministries and Other Central Bodies of the Government
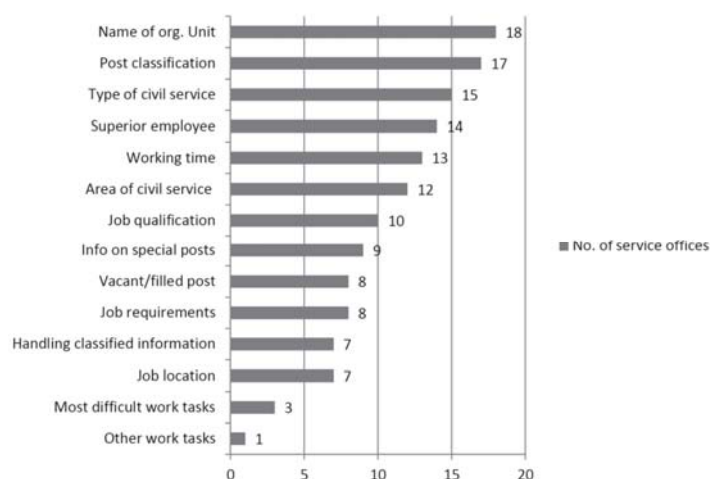
Source: Strategy on Civil Service, Government Office 2015

Hypothesis 1: The higher the ranks of the civil service the more are they subject to major politically motivated changes, visible with each parliamentary elections. Thus, we expect that the politicization of civil servants has resurged since the accession to the EU despite the spirit of the formally passed Civil service law and are higher among top ranks of the civil service.

Hypothesis 2: The replacements in top civil service are sensitive not only to changes in governments but also to changes within the ministry (head of the minister). Thus, we assume that non-merit practices serve other than purely political purposes. Rather, these practices often intend to build a network based on personal trust and loaylty for a concrete politician controlling and operating the organization.

3 Results and Discussion

The three changes of governments in 2006, 2010 and 2012 produced almost a complete substitution of personnel. The substitutions occur regardless whether the government coalition comes from right or left, the degree of turnover is relatively the same for all types of the governments. Table 1 shows the degree of replacements that occurred in that year in comparison to the previous year. It is possible to observe higher turnover immediately the year after the elections (2007, 2011 and 2013) since the new incoming government was created on 4th July 2006, 8th July 2010 and 4th April 2012. The lowest amount of turnover appears a year prior to the elections. For example mean for turnover in 2010 was only 7,8%, however, the immediate changes after the elections as reflected in 2011 were already 45%. Towards the end of 2011 the government fell and premature elections took place in early 2012 (3 months earlier than in 2010 or 2006) which is reflected that substitutions took place already in the election year of 2012 and the immediate year after (2013). Overall we can conclude that election cycles do have an influence on the turnover in the ministries on both levels of the hierarchy, despite of the existing Civil Service Law.

Table 1. Replacements in Ministries after Elections in 2006, 2010 and 2012

Replacements (annual)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Overal Mean											
Ministry of Economy		19.0%	42.6%	44.9%	39.3%	34.7%	11.4%	48.0%	45.7%	21.2%	14.3%
Ministry of Finance		12.8%	6.3%	30.3%	6.0%	3.6%	5.4%	26.4%	17.3%	10.2%	21.4%
Ministry of Transport		17.1%	9.8%	30.9%	11.6%	14.0%	13.1%	56.6%	24.5%	19.8%	8.6%
Ministry of Justice		23.2%	28.3%	43.3%	23.7%	25.7%	6.9%	63.0%	35.4%	16.1%	7.1%
Ministry of Labour		n/a	25.0%	42.9%	26.6%	19.1%	10.0%	40.2%	26.7%	42.9%	11.4%
Ministry of Education		9.7%	10.0%	35.0%	18.8%	5.8%	0.0%	36.0%	17.0%	28.6%	20.7%
Overal Mean		**16.4%**	**20.3%**	**37.9%**	**21.0%**	**17.1%**	**7.8%**	**45.1%**	**27.8%**	**23.1%**	**13.9%**
Level 2 (directors general)											
Ministry of Economy		33.3%	50.0%	30.0%	25.0%	16.7%	0.0%	20.0%	66.7%	0.0%	0.0%
Ministry of Finance		25.0%	22.2%	22.2%	12.5%	0.0%	0.0%	40.0%	30.0%	20.0%	36.4%
Ministry of Transport		7.1%	14.3%	10.0%	12.5%	11.1%	37.5%	71.4%	50.0%	0.0%	7.7%
Ministry of Justice		40.0%	33.3%	50.0%	42.9%	28.6%	0.0%	57.1%	50.0%	28.6%	14.3%
Ministry of Labour		n/a	37.5%	50.0%	28.6%	28.6%	0.0%	50.0%	33.3%	66.7%	0.0%
Ministry of Education		0.0%	16.7%	50.0%	14.3%	0.0%	0.0%	44.4%	44.4%	62.5%	37.5%
Level 2 (directors general)		**21.1%**	**29.0%**	**35.4%**	**22.6%**	**14.2%**	**6.3%**	**47.2%**	**45.7%**	**29.6%**	**16.0%**
Level 3 (directors)											
Ministry of Economy		13.3%	34.1%	34.5%	45.0%	39.6%	8.7%	40.0%	33.3%	30.4%	20.8%
Ministry of Finance		12.0%	0.0%	11.1%	3.4%	5.3%	7.5%	13.2%	5.4%	8.6%	19.5%
Ministry of Transport		20.0%	6.1%	20.5%	13.8%	17.9%	8.9%	42.0%	11.3%	30.6%	10.3%
Ministry of Justice		15.8%	20.0%	21.1%	14.3%	25.0%	5.0%	41.7%	18.2%	15.6%	0.0%
Ministry of Labour		n/a	27.8%	30.4%	34.2%	25.8%	13.5%	31.9%	25.7%	31.3%	15.2%
Ministry of Education		13.6%	6.7%	21.9%	22.2%	8.1%	0.0%	25.0%	11.8%	10.0%	19.1%
Level 3 (directors)		**15.0%**	**15.8%**	**23.2%**	**22.2%**	**20.3%**	**7.3%**	**32.3%**	**17.6%**	**21.1%**	**14.1%**

Source: Authors based on requests to ministries via Free Access to Information Law

Figure 2 shows that the depth of turnover is decreasing with the level of hierarchy as it has been noticed already by Meyer-Sahling and Veen [6]. The figure does not show the replacements on de jure political posts on level 1 – state secretaries and heads of service offices – which are all political nominees and thus 100% replaced after the elections. Nevertheless, on the level 2 of the hierarchy, which are top career civil servants, are replacements immediately after the elections

close to 50%, whereas on the third level of the hierarchy, directors of the units, it is around 25-30%.

Figure 2. Replacements Coliding with Election Years
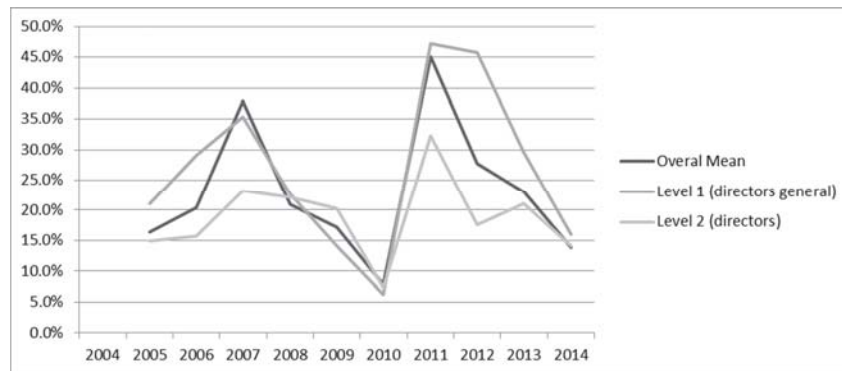
However, not all the ministries have the same turnover rate or the same human resource policy. Slovakia has a strongly decentralized human resource management, with no central coordination (Office for Civil Service was abolished in 2006). Thus, each ministry behaves differently. The least politicized ministry seems to be the Ministry of Finance which is below the everage in overal mean, but also on both levels of hierarchy. In fact, the third level of the hierarchy is not politicized at all, since turnover is relatively stable throughout the whole period. Several authors have noticed this phenomenon [1, 11] based on qualitative interviews, however it has not yet been captured quantitatively. The ministry of Finance is also perceived to be the most professional one, both in terms of substance but also in terms of internal management and human resource management. Yet, another possible explanation is that Ministry of Finance is also a very technical ministry where knowledge and skills are not replaced that easily without jeoperdizing the continuity vis a vis EU obligations.

On the othe side of the spectrum are the Ministries of Labour and Transport which are strongly politicized and the turnover on the level 2 – directors general – is reaching 70%. Althought, the third level of hierarchy is a little bit more stabilized, it still is above the average mean and is close to 30%. Both these ministries are very attractive for having „own" people in the positions since they are responsible for the design and implementation of EU structural funds. Thus, both ministries have at their disposal the biggest budgets.

3.1 Impact of a Personality of the Minister on Turnover

In our sample we have also looked on the impact of a change of the minister in the middle of the governing period on the overall turnover. The change of the minister usually follows after a medialized scandal (e.g. corruption scandal). The person to substitute the minister comes from the same political party so if any changes occur within the ministry it cannot be attributed to politicization but rather to personal trust and loayalty.

There have been several replacements of the minister outside of the governing period. In 2014, Ministry of Education witnessed two changes of the minister within a short period of time all followed by high degree of substitution, reaching 40% on the first level of hierarchy and 20% on the second level of the hierarchy. All three ministers come from the same and only ruling party SMER and have been changed in the same year. Still, all three of them felt that the top

career civil servants are not to be trusted and need to be exchanged. Interestingly enough, the second highest turnover at the Ministry of Finance in the observed period of 10 years is to be observed outside of the electoral cycle, also in the year 2014 when the rate of replacements was reaching close to 40%. It is the year when state secretaries of the Ministry have been replaced (one became the Ministry of Education and one moved to the Ministry of Economy) and this has result also in the reshuffling of the staff on the first and second level of the hierarchy.

Another important change in the personality of a minister outside of a political cycle has occurred in 2005 due to a corruption scandal at the Ministry of Economy. As a result one minister replaced another one (Jirko Malchárek replacing Pavel Rusko) from the same political party. This change in the personality of a minister resulted in a 50% turnover on the first level of a ministerial hierarchy (visible as a change that occurred in 2006 as opposed to 2005), which was higher than the data from the elections that followed after that (30%). Such a high turnover is to be attributed to two different fractions that each minister belonged to within the same political party which seemed to be more important than change of the political party. Similarly, in 2005 a new minister (Radičová replacing Kaník) at the Ministry of Labour resulted in 37% turnover reflected in year 2006. Both were coming from the same party, nevertheless, from completely different fractions (Kanik was a head of a different political party that merged with SDKU prior to elections). The turnover that was a result of elections the following year was 50% high.

We have also witnessed unimportant change of the ministries, such as in 2006 after the fall of the government when one political party (KDH) withdrew its three ministers from the government and they were substituted by state secretaries of the respective ministry which did not nesesarrily came from the same political party. Nevertheless, since this change occurred and resulted in new elections it was not expected from the replacing ministers to open new agenda and thus no replacements occurred on the lower levels of the ministries. Another unimportant replacement of a minister occured in 2009 at the Ministry of Justice when then minister Harabin became chief of Supreme court and was replaced by his colleague Petrikova not only from the same political party but a very close friend. Thus, this replacement did not result in any turnover in the ministry.

In sum, the personality of the minister matters, particularly if coming from different fractions of the same political party. If a new coming minister is only a formal figure to fill out the vacuum just before the elections then the new coming person does not have any influence, even the replacing person may come from a different political party.

3.2 Islands of Stability in Politicized Ministries?

As a next step we looked into a possibility if we can find „islands of stability" – any units on level 2 in ministerial managerial hierarchy where the unit existed for 10 years without any change and the head of the unit (director general) was replaced maximum once throughout these years, thus has survived at least two changes in the government. Table 2 shows that in the sample of 6 ministries we have found 13 cases of „islands of stability", most of them at the Ministry of Finance which is the most stable Ministry. Nevertheless, these „islands of stability" are mostly not related to the substance of the Ministry, but are service units: legislative unit in all six ministries, budget unit in three ministries, international cooperation in one ministry, printing services in one ministry. Only Ministry of Finance has also two substantive units: EU funds and state reporting. Nevertheless, other types of support units have the same level of politicization as any other substantive units, particularly heads of service units (HR management).

Table 2. Level 2 Units within a Ministry without any personal replacements during three government changes

Ministry	Stable units
Ministry of Education	3
Ministry of Economy	1
Ministry of Finance	4
Ministry of Justice	2
Ministry of Labour	1
Ministry of Transport	2

Source: Authors

Interestingly enough, in these „islands of stability" not only the heads of level 2 unit were not replaced, but also the subordinated head of level 3 units remained stable. In other words, it seems that stability on Level 2 brings stability also on Level 3 of organizational hierarchy.

4 Conclusion

Recurrence of politicization in Slovakia after the adoption of the Civil Service Law is not surprising. In fact, the scope of politicization corresponding to political cycles corresponds to the finding of Meyer and Veen [6] who found that Slovakia together with Poland have consistently the highest politicization scores deep into the ministerial hierarchy, folowed by Czech republic, Slovenia and Hungary who have high scores at the top level, but the intensity of the politicization below the top area is not that high. According to Meyer and Veen the Baltic countries are the least politicized countries of the Central and Easter Europe.

Nevertheless, the research has shown the degree of the phenomenon (scope and depth) on a sample of six ministries in the period of 2004-2014 during 3 complete changes of the government. It has proved quantitatively that the turnover after each elections can reach up to 70% on the second level of ministerial hierarchy and up to 40% of the third level of ministerial hierarchy, particularly among ministries that deal with EU structural funds. With this type of research it is practically impossible to determine the purpose of politically related decisions and forms of politicizations. Still, there are „islands of stability" to be found both on the level of a ministry (Ministry of Finance) and units within an otherwise politicized ministry which are more of a technical and supportive nature (legislative and financial units). Yet another important finding is related to the role of a personality of the minister. The replacement of a minister outside of election cycle by a person from withing the same political party resulted also in high turnover rates which proves that personal trust and loyalty play a crucial role and can be equally important as political considerations. More research is recommended on these issues.

Acknowledgements

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Knowledge Management in Public Administration.
What Can Be Found in Research Outputs in the Czech Republic - Preliminary Findings

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Abstract

The paper first introduces the topic of knowledge management in public administration. Its main focus is to summarize how it was approached in research in the Czech Republic. The research of which the preliminary results are presented is based on research outputs as recorded in the Czech information system for research, experimental development and innovations (the called "RIV"). The results indicate particularly the novelty of the topic as well as relatively high ICT-oriented approaches.

Keywords: knowledge management; public administration; public management

JEL Classification: H77, H79, H83

1   Introduction

Knowledge management (KM) is purported to increase innovativeness and responsiveness, but knowledge and KM are complex and multi-faceted concepts, and effective development and implementation of knowledge management systems (KMS) requires a foundation in several rich literatures [1]. Still in 2015 Bolisani and Handzic [4] pointed out that despite its 20 years of history and increasing importance in academia, KM still suffers, like any other "new area", from a problem of "recognition". Handzic adds that there is no general agreement about the precise meaning and relevance of knowledge management and, furthermore, there is no clear differentiation between knowledge management and the fields like organisational learning and intellectual capital. The issue may be even amplified thanks to emergence of new KC-related theories like knowledge or smart cities (e.g. [26], [13]), theory of networks is also very relevant.

The available academic literature clearly shows that KM has been paid growing attention in the literature in the last two decades. The literature discusses the concept of KM usually starting with data-information-knowledge-(wisdom) distinction and than describes and discusses what processes and changes are required to implement KM practices. The growing body of literature is dealing with barriers to KM which partly sources from characteristics of tacit knowledge as well as from mindset of employees and difficulties with chaning organizational cultures of organizations.

The concept of KM is nothing new and has been in practice for a long time, and mostly in an informal manner, and organisations have always used KM practices (in various disguises) to make decisions, and to produce goods and services, though not in a deliberate and systematic manner [6]. The body of KM literature is growing, but it may be indicated that the literature deals with recommendations and practices for/of private organizations rather than discusses what are the requirements of KM implementation in public administration and public sector organizations (see also [19]), although the public sector is widely accepted as being different from the private sector and has some unique features of its own and thus adaptation of KM practices are beneficial [6]. Still, the key elements (sometimes "components") of KM frameworks seems to be very similar to those discussed in literature focusing on the private sector - people, processes, and technologies (sometimes content is added - e.g. [10], smart city literature works with technology factors, institutional factors and human factors - e.g. [13]). However, regardless

of type, the goal for knowledge management is to support learning and organizational improvement (innovations) in the processes and functions ([7]).

Knowledge has often been managed implicitly and without specific focus. also in public administration ([25], [19]). Deliberate KM has for sometime been at the core of government tasks – inseparable from strategy, planning, consultation and implementation. In some countries (namely Australia and its AS 5037-2005, or Knowledge Management PAS 2001 of the British Standards Institution) specific KM standards were elaborated in order to serve as guides for knowledge management implementation in public organizations with a potential to improve accountability, transparency, inclusiveness (and responsiveness) by more knowledge-intensive activities and processes (e.g. [8], [5], or [10]]. However, evidence drawn from the existing literature suggests that public sector is falling behind in these practices. Governments are now realising the importance of KM to its policy-making and service delivery to the public and some of the government departments are beginning to put KM high on its agenda [6].

The ambition of this paper is not to contribute to KM concepts and theories by making propositions of changes to those which already exist. The paper also does not aim at summarizing the existing body of literature on knowledge management. Rather it tries to summarize what has been surveyed in the Czech Republic with regards to the KM. The paper represents a preliminary result of an initial research carried out within the TAČR project "Knowledge management in local and regional development" (TB040MMR008). The project framework anticipates that literature search on KM and its practices in Czech public administration and public sector organisations will be realised in order to help the research team prepare a methodology for following empirical research. The paper outlines preliminary findings of the literature search indicating to what extent the KM has been paid attention in Czech researches. The paper does not deal with KM effects and impacts in the Czech public sector for two reasons. First, it is not the objective of the paper, and, second, (as discussed below) because no relevant robust and conclusive research outputs on KM effects in the public sector were found among research outputs which were found.

A set of knowledge-management related key words was prepared following the key words used in the related KM international literature and the key words were used in searching in the Czech RIV database (see the point 2 for further information on material and methods). The presented results are very preliminary, since only titles and abstracts of research outputs were subjected to further analysis. The further metaanalysis of the relevant research outputs will follow. Still the author thinks that the results presented indicate problems of KM research in the country and raise important research questions for the future.

2   Material and Methods

As outlined in the Introduction above, a set of KM related key words was prepared which was following the key words used by authors in the international KM literature. The English key words which were used in searches are linked to the findings in the section 3 below (see the Table 1).

The Czech "RIV" database (The Czech "RIV" (Information Register of R&D results; http://www.vyzkum.cz/FrontClanek.aspx?idsekce=1028) is one of parts of the R&D Information System. The RIV has collected an information about results of R&D long-term intentions and R&D projects supported by different state and other public budgets, according to the R&D Act [Code number 130/2002]. The RIV is a higher version of the former Register of the R&D Publication given by Czech public research institutes [RIP]. The RIP was operated by the Government Office of the Czech Republic until 1995. The RIP has collected data since 1993. The search instrument is available here: http://www.isvav.cz/prepareResultForm.do) and its search instrument was used for the searches. This database enables searches by key words also. Records in the RIV database are important because they are linked to ex post national funding of research in the Czech Republic. Individual search outputs were saved in the xls format in order

to be available for further researches and possible meta-analysis. The preliminary findings that are presented below are based on titles and content of abstracts of research outputs found in the RIV database. No specific software was used. The findings are based on information available by October 2015 when research outputs published till the end of 2014 were the last recorded in the RIV database.

It must be noted, that one must be aware of the term "knowledge" in the Czech language, because it has not always the same meaning as knowledge defined in the international KM literature. For example, Spender concluded that majority of the field´s writers define knowledge as data, and this determines ex assumption what they mean by KM - part of IT [22]. He recommends that a better way to grasp KM is to recognize and exploit the variety of epistemologies (notions of knowledge) already available to us. Based on the literature analysis, similarly O'Riordan [16] summarizes that many authors point to the difficulty of succinctly defining the concept, suggesting that it would seem appropriate to avoid imposing a strict definition but rather regard KM as a multi-layered, multifaceted concept that can impact different organisations in very different ways. Alavi and Leider [1] summarize that knowledge may be viewed from several perspectives (1) a state of mind, (2) an object, (3) a process, (4) a condition of having access to information, or (5) a capability. These different views of knowledge lead to different perceptions of KM. An understanding of the concept of knowledge and knowledge taxonomies is important because theoretical developments in the knowledge management area are influenced by the distinction among the different types of knowledge (1). Practices of KM are also context-specific ([7]), and a large body of literature have been dealing with specifics and issues of public administration reforms in transition countries from the Central and Eastern European (from the more recent see, for example, [11], [17], [14], [15], [3], [12]).

The hypothesis which will not be further tested in this paper may be that in Czech research outputs KM is predominantly understood as information management that may facilitate circulation of existing - explicit or tacit if coded - knowledge, particularly know how, inside and outside organizations. That is why information management was included in the searches also.

3   Results and Discussion

Results of the searches for the key words in research outputs recorded in the Czech RIV database are summarized in the Table 1 below. This is further specified in the Appendix.

The author is aware that the findings could be structured more. The findings could be structured around

- the key KM elements distinguished in the KM literature (e.g. people, processes, technology),
- layers usually linked to KM (for example the APO knowledge management framework work with accelerators, knowledge process and outcomes, [APO, 2013])

This will be done in further part of the research project when a research will analyze content of the research outputs. Regardless their structure, the preliminary findings indicate the following features of KM research in the Czech Republic:

KM research is focused particularly on potential and awareness and practices for private businesses. KM in public administration / public sector is a rather new topic of research in the country. As recorded in the RIV database, research outputs were started to be published mostly after 2010. Although there are some exceptions the abstracts of the research outputs indicate that the vast majority of research outputs related to KM which are recorded in the Czech RIV database summarize particularly a potential of KM instruments and tools and does not specify cases of KM implementation and their effects. The searches revealed that only very limited research outputs focused on KM in public administration. When speaking about KM in the public

sector, most research outputs recorded in the RIV database concentrate on KM in national security (particularly in the army) and police and also on KM in university education. Few research outputs deal with KM potential for management of crises and water resources management. The repetition of research findings in research outputs (co-)/authored by the same authors will not be further discussed here.

Table 1. Knowledge management key words and research outputs in the Czech RIV

Key words used	Total items found	Focused on PA/PS
knowledge management	552	55 (10 %)
knowledge systems	27	4
knowledge processes	10	0
knowledge-based	116	8
knowledge technology	3	2
knowledge technologies	9	3
evidence-based	62	1
knowledge city	0	0
information management	102	14
knowledge management process(es)	1	0
knowledge systems	27	5
knowledge management system(s)	26	7
knowledge sharing	79	7
stakeholder analysis	8	1
innovation management	42	1
organizational knowledge	1	0
organizational learning	23	12
organisational learning	18	8
learning organization	35	1
learning organisation	15	3
knowledge organiz(s)ation	15+2	0
collaborative organiz(s)ation	1 + 0	0
knowledge worker	67	2
benchmarking	360	57
benchlearning	0	
collective thinking	1	0
e-government	190	

Source: Author

Benchmarking was given a relatively large attention in research focusing on public management. This may be a consequence of its rather high popularity in comparison to other tools and methods linked to quality management in Czech public administration (see [21]). Again, mainly potential rather than real effects are presented in the research outputs recorded in the Czech RIV database.

The titles and abstracts of research outputs found indicate that KM research is rather ICT focused. This can be seen within a group of research outputs which used the KM as the key word as well as in the number of research outputs dedicated to "knowledge worker", and also to e-government. This has been criticized quite frequently in the international KM literature. Based on the literature survey and case study research design, for example, Storey and Barnett ([23]), warned that the main allegation however was simply that, "while the implications [of knowledge management] for information systems development and practice have received close attention, the implications for personnel management development and practice have not". They also criticize that the IT-driven approaches tend to be supply driven - focused on making existing knowledge more widely availably assuming that people will be willing to share their knowledge

and also that people will use the information which was made available on intranets and the like. They also refer to related problems of expressing (and codifying) tacit knowledge.

Organizational learning is used in researches focused on KM in schools (primary and secondary education). Again, particularly potential rather than effects is presented by the authors as indicated by the preliminary analysis of abstracts of research outputs recorded in the Czech RIV database. Authors use "Learning organization", "Knowledge organization", "Knowledge worker" among key words only rarely.

4 Conclusion

The paper summarized the content of Czech research outputs dedicated to KM. The research followed the objectives of the broader TAČR project of which the initial phase requires an overview of what has been surveyed with regards to the KM in public administration / public sector organisations. The author is aware of the fact that the findings presented above are preliminary. Still, they facilitate further meta-analysis of what is available in research outputs in the Czech country. The findings clearly indicate that the concept of knowledge management may not be totally new, but research outputs focused on KM implementation in the public sector started to use "knowledge management" among the key words mainly after 2010, i.e. more than a decade later in comparison to approaches to KM in the international literature This may raise question about awareness of the topic (explicit knowledge management research) in the Czech academia. as well as in Czech public administration/public sector The findings also indicate that the available research on KM in public administration / public sector is rather technology oriented. This may enhance the view that KM may be only about technologies and that technologies, rather than people, comes first when implementing KM in organisations, although such approaches were criticized in available international literature already more than two decades ago.

Acknowledgements

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Appendix

Knowledge management key words and research outputs in the Czech RIV (specification of the Table 1)

Keywords used	Outputs focusing on PA/PS	Short references (year of publishing, area of focus)
Knowledge management	55	Krčál and Rešlová (2014, KM in waste management), Buřita (2013, 2014, military universities), Fanta et al. (2014, water management), Rosman (2013, ICT in university education), Zuzák and Junková, 2013, police), Sojka (2013a, 2013b, 2012, 2006, libraries), Michálek (2013, national security), Motejlek et al. (2013, ICT in crisis management), Tripes (2013, national sport policy), Buřita and Malý (2013, guide for ICT in military KM), Junková (2013, police), Michálek (2013, intelligence), Štefánková and Moravčík (2012, higher education qualit y assessment), Buřita and Rosman (2012a, 2012b, ICT and university), Buřita et al. (2012, KMS in military universities), Buřita (2012a, 2012b, 2011a, 2011b, 2010, KMS in army), Vránová (2012, education), Griffin et al. (2011, university education), Lorenz (2011, information ecology of a uni dept.), Buřita (2011, research and education), Ondryhal and Buřita (2011a, 2011b, KMS in army), Chytilová (2011, education), Bureš et al. (2011, universities), Koliš and Vrbová (2011, social networks and academic workers), Ondryhal et al. (2011, national defense), Antlová and Tvrzník (2010, ICT support in hospitals), Saeed and Mikulecký (2010, **public services, Pakistan case**), Kuric et al. (2010, army), Buřita et al. (2010, army), Anderle and Kný (2010, police), Kaderka (2010, cyber defence, army), Štěpánková et al. (2007, technologies in healthcare), **Vláčil (2006, private management practices and their usability in PA and regional development management)**, Fiala (2006, universities), Hřebíček and Hejč (2006, waste disposal), Beránková and Šebestová (2006, healthcare), Přečková and Zvárová (2004, healthcare), Kroftová (2004, small scientific library), Mikulecký and Mikulecká (2003a and 2003b, 2000, universities), Bureš and Čech (2003a, 2003b, universities), Mikulecká, Mikulecký and Semrádová (2001, universities), Mikulecký (2000, KM intro for **PA**)
Knowledge systems	4	Fanta et al. (2014, water management), Přibyl et al. (2011, transport systems), Toman (2007, water management), Přibyl (2002, transport control)
Knowledge-based	8	Svoboda and Černý (2013a, 2013b, customer satisfaction and loyalty in higher education), Buřita (2013, KMS in military universities), Pařil (2012, municipal library), Toman (2010, water control centres), Mikulecký et al. (2007, river basin management), Kašparová and Křupka (2007, crisis management), Mikulecký (2006, river basin management)
Knowledge technology/tech nologies	5	Toman (2011a, 2011b, water resources management), Radovan et al. (2011, water management), Bureš et al. (2009, e-tourism), Bureš and Čech (2003, universities)
Evidence-based	1	Klugar et al. (2014, healthcare),
Information management	14	Rak and Ulčíková (2014, emergency management), Střížová and Smutný (2013, university), Buřita and Malý (2013, guide for the Ministry of Defense; 2011, 2010 NATO NEC,), Mazal (2013, military engineering IM), Chromý et al. (2013, higher education), Lorenz (2011, universities), Hrůza and Černý (2010, military operations), Ráček et al. (2008, e-gov, environmental information), Hřebíček et al. (2007, environmental information), Hřebíček et al. (2005, 2003, environmental information), Lorenc (2001, army)
Knowledge systems	5	Fanta et al. (2014, water management), Přibyl et al. (2011, 2002, transport management), Toman (2007, water management), Mikulecký et al. (2003, water management)

Knowledge management system(s)	7	Buřita (2014, 2013, 2012, 2011a, 2011b, military universities/army), Buřita and Rosman (2012, universities), Buřita et al. (2012, military universities)
Knowledge sharing	7	Margarisová et al. (2014, 2011, higher education), Kerry et al. (2012, police), Malý and Buřita (2011, NATO), Bureš et al. (2011, universities), Antlová and Tvrzník (2010, hospitals), Mikulecký (2005, universities)
Stakeholder analysis	1	Zahradník et al. (2014, environmental governance),
Innovation management	1	Jurča (2009, university)
Organizational learning	12	Novotný et al. (2014, 2013a,2013 b, 2012, schools), Sedláček et al. (2013, 2012, schools), Lazarová (et al.) (2013a, 2013b, 2012a, 2012b, schools), Pol et al. (2011), Hloušková et al. (2010)
Organisational learning	8	Trnková et al. (2013, schools), Pol et al. (2013, 2012, 2011a, 2011b, 2010, schools), Malčík and Seberová (2011, schools), Pol (2008, school)
Learning organization	1	Pol et al. (2010, schools)
Learning organisation	3	Seberová and Malčík (2010, schools), Pol (2008, schools), Hajer-Müllerová (2004, university)
Knowledge worker	2	Mládková (2013, social services; 2011, police)
Benchmarking	57	Luštický and Bína (2014, tourism), Pavlová et al. (2014a, 2014b, health care), Plaček (2014, 2013, higher education, municipal budgets), Plaček and Půček (2014, municipalities), Řehoř et al. (2014), Půček and Plaček (2014, municipalities), Nenadál et al. (2013, higher education), Osertová et al. (2013, waste management), Kyncl et al. (2013, water supply companies), Sosnová-Poláchová et al. (2013, PS), Luštický et al. (2012a, 2012b, 2011, tourism destination), Vrábková (2012a, 2012b, municipalities), Mikušová-Meričková (2012, 2011a, 2011b, municipalities), Škrabal et al. (2011, microregions), Machek (2011, energy utilities), Jetmarová (2010, environmental management), Poláchová Vašťatková (2010, schools), Prášilová and Vašťatková (2010, 2009, schools), Marek et al. (2010, microregions and "MAS"), Bartošíková (2010, PA), Neshybová (2010, municipalities), Cimbálníková (2009, education), Škrabal (2009, 2008a, 2008b, rural areas), Ochrana et al. (2008, PA), Vašťatková (2008, schools), Loudín et al. (2008, regional innovation), Čadl and Váchová (2007, transregional), Šebková et al. (2006, higher education), Binek (2006, municipalities), Fibírová (2006, municipalities), Charbuský and Stejskal (2006, PA), Rössler (2006, health care), Široký (2006, 2005, 2003, PA), Voldánová and Honus (2005, municipalities), Filáček (2005, 2004a, 2004b, research policy), Švec and Boušková (2005, regions), Štěrba (2005, railways), Ježek (2004, municipalities), Janáková (2004, e-gov), Rumpel (2004, local/reg development), Roudný (2004, rural areas), Provazníková and Volejníková (2002, PA), Škarabelová (2002, PA), Provazníková (2001, public services)
E-government	190	

Does Negative News Create Tax Evaders?
Evidence from a Tax Compliance Experiment

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Abstract

Tax evasion is perceived as one of the main problems of public finance. People tend to avoid paying taxes if they do not recognise a return in the form of public goods provided by the state or local government. The rate of tax compliance might also be affected by external factors such as the media, which hold great power over public opinion. We conducted a laboratory experiment to study whether the framing of the effectiveness of state spending influenced the decision to pay taxes. Subjects read news headlines with information on how state institutions spend their budgets. Our results showed that while positive news increased tax compliance compared to a control group, its effect was not statistically significant. Negative news significantly increased tax evasion. Our main findings suggest that if people receive signals of ineffective state spending, their willingness to pay taxes drops considerably.

Keywords: experiment; tax; compliance; evasion; media; framing

JEL Classification: H26, C91, H41

1 Introduction

Humans tend to believe that they are rational actors who weigh all of the available data to make the most informed decision possible. But the reality is often different. We all are jeopardized by cognitive biases that can affect our thinking and our decisions. One of the most serious, important, and tenacious cognitive biases is the *framing effect*. Many authors have employed a number of approaches to framing [29]. In our study, we followed the sociological [15], rather than psychological [18], [19], tradition of framing.

Entman [9] wrote that "to frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described." The way an issue is presented in the media can have an influence on how it is evaluated by the public [25], [30]. Framing can shift people's attitudes towards an issue. Media stories focusing only on the negative aspects of politics, for example, can result in a public that is annoyed with their political representation or disillusioned by the state in general, which may lead to lower turnout for elections and/or rising support for extremist (or populist) parties and other negative phenomenon. Framing is therefore sometimes understood as the second level of the agenda-setting process [26].

The process of comprehending frames can be simply described as thinking about the world within a familiar context [24]. Frames are "mentally stored clusters of ideas that guide individuals' processing of information" [9]. They represent a set of tools meant to help the audience to interpret the world meaningfully [15].

There is agreement that frames can help us understand the meaning of the world. How do different frames affect human behaviour in specific situations? In our study, we used frames as an independent variable to determine if and how they affect willingness to pay taxes.

The issue of tax evasion and tax compliance has been a research subject for many years [3]. Early research saw tax evasion as an economic decision under risk and taxpayers as rational

individuals [1]. In this situation, the taxpayer weighs the benefits of cheating against the prospect of getting caught and facing the consequences [2]. Even though there is evidence that tax rates, audits, and punishment influence tax compliance [1], [4], [11], their effects can be lower than predicted, and economic determinants alone do not fully explain tax compliance. According to Alm [3], most rational taxpayers would evade taxes, because there is little chance of being caught.

For this reason, a growing body of literature have considered psychological determinants, such as attitudes towards the state, fairness, and social norms, to be important factors [5], [13], [21], [32], [33]. Feld and Frey [10] saw the roots of tax compliance behaviour in a "psychological tax contract" between the taxpayer and the tax authority, when tax compliance depends on a good and cooperative relationship between them. The r*elationship involves duties and rights for the taxpayer and for the tax authority. Taxpayers might be willing to not evade taxes even if they do not receive a perfectly good equivalent to their tax payments. However, the political process must be perceived as fair and legitimate. The authors added that friendly treatment of taxpayers by the tax authority in the auditing processes increased tax compliance.*

Kirchler [21] and Kirchler et al. [22] presented the slippery slope framework, a two-dimensional framework that integrates economic and psychological factors. The first dimension is power – the taxpayer's perception of the power of the tax authority and its ability to detect tax fraud and to punish it. The second dimension is trust – the taxpayer perceives the tax laws as clear and the tax authority as fair and operating in the interests of the community.

The slippery slope framework has two levels: individual and aggregated. On the individual level, it differentiates between voluntary compliance, which results from taxpayer trust in the tax authority, fairness, and social norms, and enforced compliance, which results from the power of the tax authority. On the aggregated level, power and trust create either an antagonistic climate (high power) between the taxpayer and the tax authority or a service climate (high trust). Tax payments are influenced by the combination of power and trust. The lowest compliance can be expected when the level of both power and trust are low. Expected payments increase when the level of trust increases; the same happens with increases in the level of power. The highest expected payment is made in situations of high levels of trust and power [21], [22].

This framework and the link between trust, power, and intentions to comply is generally supported by empirical evidence [23], [34]. Kaplanoglou and Rapanos [20] showed that trust increased voluntary compliance and power increased enforced compliance. Interestingly, power had no effect on voluntary compliance in a situation with a high level of trust; however, in a situation with a low level of trust, high power led to lower compliance. The authors suggested that when trust in authorities is high, their power is perceived as legitimate, but when trust is low, that same power is perceived as coercive. Gangl et al. [13] claimed that even though coercive power may efficiently increase tax compliance, its psychological effectiveness lies in deterrence and enforcement through audits and fines, which leads to enforced compliance, but lowers voluntary cooperation. This situation creates an antagonistic climate, which can only be changed into a service climate through the establishment of legitimate power and reason-based trust.

In our experiment, we focused on the influence on voluntary compliance of information that signals to taxpayers how effectively and reasonably their money is spent by state authorities. From the existing literature, we concluded that perceived effectiveness and the state's ability to contribute to and maintain public goods are factors that affect the taxpayer's decision to comply. Since taxpayers are sensitive to how the government uses tax revenues, if taxpayers feel that their interests are represented by political institutions, their willingness to pay taxes increases. A more legitimate state will lead to higher tax compliance [7]. An increase in the taxpayer's positive attitude has a positive effect on tax compliance and vice versa [31]. Some authors have perceived tax compliance as a social contribution dilemma [34]. If people do not believe public money is spent effectively, their contribution may depend on the enforcement

power of the authorities. Their voluntary share increases if they believe that their money is indeed invested in public goods.

We therefore proposed following hypotheses: If people receive signals of the ineffectiveness of the state, their voluntary compliance will be lower than if they receive positive signals.

2 Material and Methods

2.1 Experimental Design and Procedures

Our laboratory experiment took place in December 2014. Participants were students of Masaryk University, recruited through the ORSEE database [16]. A total of 260 subjects participated in the experiment (mean age = 22.3, women = 64.2%).

The experiment was fully computerized and run in z-Tree [12]. Participants played a public goods game in groups of four. Three experimental conditions – control, positive, and negative – were tested as between-subject conditions in independent sessions. Research has suggested [6], [8], [14], [17], [28] that the source of money (house money vs earned income) could play a role in tax compliance behaviour. Durnham [8] stated that in order to study the influence of context on tax compliance, it is necessary to consider the possible interdependence of context and source of income. To control for that, in each setting we gave half of the participants an experimental currency and the other half had to complete a real-effort task in order to earn the experimental currency. The wage distribution for the endowed participants was based on the results of the participants who had to complete a real-effort task; thus we kept the same wage distribution among subjects in both treatments.

The whole experiment consisted of five rounds, each with two stages. In the first stage, the earning stage, participants were either given a random income or they completed a real-effort task (the tasks are explained in the appendix). In the second stage, the declaration stage, participants were asked to report their income (they could decide whether to cheat) and then to pay a flat 15% tax on this reported income. For each participant, there was a 1 in 20 chance of tax investigation in every round. All of the tax-evading subjects who were caught were fined the equivalent of the unpaid tax amount multiplied by ten.

After the declaration stage, the participants could see how much money was paid in taxes in the whole group. Each participant received 1/8 of this sum, and half of the sum was sent to the virtual tax authority. Participants were provided with instructions and information explaining the structure at the beginning of the experiment. Partner matching has been used.

Throughout the whole experiment, news-style information on the state's efficacy in the form of news headlines appeared every six seconds at the bottom of the screen; the only exceptions were during the phase when participants were being given money or completing tasks and when they were looking at the screen on which they had to declare their wages. Our experimental manipulation consisted of changing the tonality of the headlines throughout the experiment. In the positive condition, participants could read about positive use of money by the state; in the negative condition, they got information about the ineffective use of money by the state; and in the control condition, there was no news-style information. We used real news headlines, the positivity and negativity of which were determined in a pre-test.

In each treatment, subjects were paid 50 CZK (approximately 1.85€) for showing up on time. Subjects were aware that there would be one round randomly selected for payment at the end of the session. They played five one-shot games. The average earning was approximately 220 CZK (8 €).

Table 1. Treatments, with number of news observations in parentheses

	Control (No news)	Positive news	Negative News
Endowed	T1 (220)	T7 (200)	T8 (200)
Earned	T2 (220)	T5 (220)	T6 (240)

Source: Authors

3 Results and Discussion

When measured by the decision of whether to comply, half of the subject pool (49.8%) decided to evade taxes; they did not pay their taxes in the prescribed amount. This quite massive evasion led to only 71.1% of the expected maximal tax revenue. tax revenue.

The results show quite strong framing both on overall tax evasion and on mean tax compliance rate. Subject viewing negative news headlines declared a significantly lower income (64.1% compared to 72.5% in the control group and 76.5% in the positive news group) and evaded more often than in the other two settings (60.2% compared to 46.8% in C and 43% in P).

Table 2. Average tax evasion rate and mean tax revenue among treatments

		Control	Negative	Positive	Total
Earned	Tax evasion rate	49.1%	60.5%	44.2%	51.0%
	Tax revenue	.708	.655	.754	.707
Endowed	Tax evasion rate	44.5%	60.0%	41.5%	48.5%
	Tax revenue	.742	.625	.779	.716
Total	Tax evasion rate	46.8%	60.2%	43.0%	49.8%
	Tax revenue	.725	.641	.765	.711

Note: Differences are significant on 99% level

Source: Authors

The effect of positive news, although present, was not that strong. The level of tax compliance was slightly influenced by the way the subject received their initial endowment. Subjects who earned their income by completing real-effort tasks in the first part of the experiment tended to evade more often (51%), while the effect on tax revenues was the opposite. The subjects who were endowed were more likely to evade (tax compliance 71.6%).

Table 3. Impact of audit on tax evasion and mean compliance rate

Audit		Control	Negative	Positive	Total
No	Tax evasion rate	45.8%	61.8%	43.1%	50.0%
	Tax revenue	.728	.640	.761	.711
Yes	Tax evasion rate	53.2%	46.5%	41.7%	48.2%
	Tax revenue	.708	.646	.814	.716
Total	Tax evasion rate	46.8%	60.2%	43.0%	49.8%
	Tax revenue	.725	.641	.765	.711

Source: Authors

The use of framing during the experiment had another influence on the participants' decision to comply. As depicted in Table 3, there were differences in the reaction to the audit among the treatments. In the C condition (without news), subjects who had been audited increased their level of tax evasion with a lower tax revenue. On the other hand, those who had been subject to the conditions with framing (both positive and negative), slightly decreased their level of tax evasion with a higher compliance rate. The effect of the audit was strongest in the N

treatment, where the ratio of tax evasion dropped by 15 % (61.8% before the audit, compared to 46.5% after it).

Table 4. Impact of detection on tax evasion and mean compliance rate

Detected		Control	Negative	Positive	Total
No	Tax evasion rate	44.9%	59.6%	41.7%	48.5%
	Tax revenue	.735	.655	.772	.722
Yes	Tax evasion rate	71.9%	70.8%	84.6%	73.9%
	Tax revenue	.599	.410	.553	.525
Total	Tax evasion rate	46.8%	60.2%	43.0%	49.8%
	Tax revenue	.725	.641	.765	.711

Source: Authors

The behaviour of the subjects who were detected by the audit (i.e. found guilty as tax evaders) was consistent among treatments. Subjects found guilty by the tax audit authority tended to increase their risk aversion and comply more (73.9% of tax evaders after detection compared with 48.5% of tax evaders in a group of non-penalized subjects).

To go further into the analysis of the motives for tax evasion, we measured the odds of various characteristics that might influence the decision to evade. The results of a probit estimation is shown in Table 5. Three models (P1, P2, and P3) were derived so as to emphasize the potential influence of respective factors.

Table 5. Probit models of tax evasion decision

	P1	P2	P3
Intercept [Compliance = 0]	**-0.415****	**-0.591*****	**-0.564*****
	0.200	0.199	0.195
Negative	**0.350****	**0.323****	**0.319****
	0.148	0.153	0.148
Positive	-0.095	-0.119	-0.106
	0.165	0.176	0.172
Earned	0.080	0.099	0.096
	0.140	0.145	0.140
Gender (1=male)	0.038	0.013	-0.016
	0.149	0.141	0.136
Slovak	-0.045	-0.061	-0.088
	0.105	0.110	0.113
Religion (1=yes)	-0.058	-0.021	-0.015
	0.176	0.170	0.166
Big town (1= more than 50,000 inhabitants)	0.208	0.218	0.225
	0.144	0.142	0.132
Small town (1= less than 3,000 inhabitants)	0.028	0.020	0.022
	0.153	0.157	0.160
Left right (political orientation)	0.033	**0.041***	**0.038***
	0.022	0.022	0.022
Work experience more than 3 years		**0.272****	**0.286****
		0.138	0.139
Audited before			**-0.683*****
			0.196
Audited and detected before			**1.356*****
			0.345
Observations	1300	1285	1285
Pseudo R2	0.023	0.030	0.051

* p<0.1; ** p<0.05; *** p<0.001

Source: Authors

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The influence of the negative condition was strongly confirmed by the probit model analysis. In all three variants of the model, the odds for the negative setting was significant. The presence of negative headlines during the tax compliance decision increased the probability of tax evasion by 0.35. Subjects who had been employed for longer than three years also tended to evade more. A positive, but not significant, impact on the decision to evade taxes was seen among subjects living in bigger cities. The influence of positive framing was slightly (not significantly) opposite. Subjects who earned their money before the decision to comply with the tax tended to evade less. The results confirmed the influence of auditing and detection on the decision to comply with taxation. Subjects who were detected in previous rounds strongly tended to evade more often (odd equal to 1.356).

The framing again influenced the proportion of declared taxes (compared to tax liability). While negative news led subjects to (significantly) lower tax compliance, positive news increased tax compliance. The effect of positive news was less intensive and not significant. Men tended to lower their compliance level more than women. Those who declared themselves to be religious complied less than the rest of the group. The influence of auditing and detection was the same.

4 Conclusion

In our experiment, we examined the influence of the framing of the state's effectiveness on taxpayers' willingness to pay taxes. We used news headlines to manipulate the information that participants received about the spending habits of various state institutions. We created two conditions, positive headlines and negative headlines, and also created a control group with no news headlines. The results showed that the behaviour of subjects was different in every treatment and the frame of the effectiveness of the spending influenced tax compliance.

Participants subjected to positive news were more willing to comply. However, there was only a small difference between their compliance and the compliance of the participants in the control group. On the other hand, negative news headlines influenced tax evasion in a significant way. The compliance of the participants who were shown negative headlines was significantly lower than those who were shown positive or no headlines. If participants received signals of an ineffective state and the ineffective use of "their" – meaning taxpayers' – money, their willingness to pay mandatory contributions decreased. Positive news increased compliance, but this increase was considerably lower than the drop in compliance caused by negative information. This result is in line with the results of studies showing that negative information has more influence on people than positive information [27]. Our results are also closely related to studies that see trust as an important factor influencing compliance. Even though we did not measure trust specifically, our findings suggest that if people do not believe in the state's ability to provide the common goods that they expect, they are more likely to evade than pay taxes.

We are aware of certain limitations to our experiment. Our subject pool contained only students, most of whom have little opportunity to evade taxes in real life. This limit is also supported by one of the results – participants with more than three years of employment experience were more likely to evade, which suggests that a subject pool of non-students, with more working experience, might produce slightly different results. Nevertheless, while we are cautious about generalizing our findings, we can confirm an existing causal relationship between the framing of effectiveness of public spending and willingness to pay taxes.

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Appendix

We used five tasks. Each participant completed each task once. Earnings depended on the number of correctly answered or solved tasks.

Task 1:

Participants were asked to arrange five words in alphabetical order. They were told to sort ten groups of five words within a time limit. They earned money for every word sorted correctly.

Task 2:

Participants were presented with a matrix containing zeros and ones. Their task was to count the number of ones. They were told to solve eight matrices and earned money for each solved matrix within a time limit.

Task 3:

Participants were shown four letters on a screen and told to rearrange them to create a real Czech word (within a time limit). There were twenty words to be created, and participants earned money for each correct word.

Task 4:

Participants were presented with a table containing nine numbers (each with two decimal numbers). The task was to find two numbers that added up to ten (within a time limit). They were to solve ten tables, and they earned money for every pair of numbers chosen correctly.

Task 5:

Participants saw a coloured word on a screen. Their task was to mark the colour which the word spelled. They were to mark a hundred words, and they earned money for every colour marked correctly.

The Paradox of "Lost Engagement" in the Public Sector Theory

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Abstract

The paper deals with the paradox of "lost engagement" in the public sector theory. Although we face in the present time many serious problems public sector theory does not to them pay appropriate attention. Even when some problems are reflected by theory, the reflection does not sufficiently affect real life or the reflection represents only sporadic attempts. The paper brings examples of the Czech scientific paper that are engaged, it means they try to analyze the serious problems in time of publishing the paper. Further we shortly discuss Czech and foreign books trying complexly analyze development of the world in the latest fifty years. Based on this we will outline what an engaged and comprehensive concept of the presence should include and why its important part should be a solution of principal issues of the public sector. We will also suggest some recommendations which would enable to strengthen the engagement element in the public sector theory - without being at the expense of the theory, but on the contrary – to emphasize one of the basic functions of science which is to identify assumptions of validity of scientific fundamental statements.

Keywords: engagement of public sector theory; human and social capital; sector of productive services; transferred price

1 Introduction

The present time confronts us with many serious social problems. They include mass immigration, organization of the European Union and Eurozone, funding of public budget deficit and public debt, etc. In the Czech Republic the problems also include reforms of the school system, health services, pension system and other areas of the public sector. Paradoxically, we can find only few scientific works dealing with those issues at a sufficient depth.

The article tries to answer the question why it happens. Why public sector theory is not sufficiently engaged in solving present serious problems? Our approach is following: first we shortly discuss some examples of the Czech scientific engage papers [9, 12, 16] that least focused some problems connected with public sector theory but they have little or even no impact on further development. Simply the papers were just written and (almost) nothing happened. We offer answer what was missing at these papers and how it affected their impact. Further we shortly but critically analyze some works (usually books) trying to complexly reflect problems that society facing in time of writing and publishing of the work [14, 7, 15, 13, 2, 3, 6, 11]. We again try to summarize what was missing at them and how missing part is connected with problem of engagement of public sector theory. Based on that we formulate what should contain concept analyzing and solving current problems and should be contained in a comprehensive and conceptual solution of these problems.

2 Material and Methods

We understand that our analysis and results are rather subjective and difficult to testify. But we think that scientific attempts to solve present serious problems must learn from previous experiences and failures. Critical reading and discussion of previous attempts is a way to do it. Each such analysis is always subjective but it is able to bring new ideas. The validity of our

approach could be further prove in practice – if scientific papers containing our recommendation have practical impact and based on them appropriate changes happen it could be concluded that our approach bring results.

3 Results and Discussion

3.1 Some Examples of Czech Engaged Scientific Papers … but with Small Impact on Reality

The issue of engagement in the theory dealing with social affairs should be understood primarily as a theoretical problem, despite the fact that it has also its insignificant existential, moral, pragmatic, ideological and political dimensions. Theoretical consistency is based in the first place on the fact that if there is a certain theoretical reflection of a serious social issue then the theory, as a collective formation of knowledge, should pay permanent attention to it until a way is found to its solution. An opposite approach is to encounter the issue, to describe it, but not to include it into the theory. Let us provide some specific examples from our country´s environment when scientific papers try to solve serious social problems but theory does not include, or includes only partially, their finding into its subject matter. The examples were not selected incidentally but rather as examples which meet two criteria: They address a serious contemporary problem and they have been published in one of the most prestigious national social economic sciences magazines (Politická ekonomie).

It has been more than ten years since V. Klusoň wrote: "*Big growth of wealth and property leads to big power which should be supported by big responsibility. However, if the property is distributed to the population unevenly – often the distribution is a consequence of violation of a moral law – then also the power is distributed unevenly and this unevenness gets even worse with the growing population. If the number of population does not significantly change it might perhaps be possible at least somehow regulate the distribution of wealth in favor of the poorer and then, after reaching an acceptable degree of even distribution, the economic growth could be slowed down or even stopped and thus it might be possible to prevent destruction of the natural and living environment. However, this is not possible with the growing population because it is the poor who need to vigorously demand an ever faster economic growth so that their situation can at least slightly improve. Consequently, the wealth and power of the rich keep growing beyond any limits and the growth cannot be stopped. – The power of the rich transforms into powerlessness and their responsibility degenerates into irresponsibility..*" [9]. The problem quite accurately described by V. Klusoň is undoubtedly serious. Ten years have passed since its identification and a relatively precise empirical –theoretical description in the journal which should serve as a forum to share scientific knowledge and its further development. Since then, the problem has sharpened and acquired additional parameters on one side and, on the other side, we have not seen any attempts in impacted theoretical journal (including public sector theory where it belongs) to make it more accurate or to redefine it, not speaking of any attempts of its theoretical solution.

Another example is a problem addressed by another renowned economist, L. Mlčoch, in some time ago, in connection with the issue of the so-called "positional goods ": "*The concept of positional goods … is connected with competition of people when it comes to their positions. For example, education is more or less public goods everywhere and it produces positive externalities. The demand for education grows for this very reason but, with an increase of its general level its "utility" logically decreases . This only boosts the role and the power of symbols and the achieved exceptional educational status (Oxford, Harvard...)...*" [12] P. Štika in his paper, in which is explicitly refers to L. Mlčoch, came with some formulations that partly specified and developed his contribution toward identification of causes of the current problems - see e.g.: "*Exclusive consumption of positional goods usually increases subjective happiness, however if the consumption of such goods spreads among others the effect disappears. Negative externality imposed on a person because of consumption by other community members leads to situations similar to the arms race during the cold war. The effort to differentiate oneself from the peers and*

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to get closer to those to whom the person looks up results in a continual increase of consumption. This, however, has the same effect as the proverbial attempt of one viewer at a sports stadium who wants a better view and therefore he stands up. The result is that nobody can see better and everybody gets worse because they are all standing now." [15]. Not even such a precisely and in a gradating manner described issue was theoretically reflected on in the following ten years. Meanwhile, we can see that the situation in this area is quite dramatically developing:

- The process of "the rich getting richer and the poor getting poorer" is not only continuing but it is accelerating. The exact data can be found in [1].
- Positional investing and the related positional competition lead to significant losses of social effectiveness. It limits possibility of use of investment opportunities associated with the development, keeping and deployment of capabilities (human capital) of an ever growing part of the population. For example, most of the population is being offered less and less quality education. For details see e.g. [9]. But it is just human and social capital that is the decisive condition of practical people´s employment of people. If a person does not obtain appropriate level of human and social capital through education, it has little chance to protect its interest and to be a full-blown member of society [8].
- Positional competition leads to pressure on breaching of generally acceptable principles (written, unwritten, established in the morals or laws) and, subsequently, to formation of structures based on mutual covering, blackmailing and favoritism for those who get information about breaching of such generally acceptable principles. [19, 20].
- Social networks are established based on the positional investing and mutual covering of breaching of the generally acceptable principles; the structures created in this manner penetrate the institutional system and get it under control [19, 20].

Why it happens? Why articles trying to analyze above mentioned problems have small impact on practical policy? From our point of view, the reason comes from the fact that the articles did not catch the essence of the problems – they were able to discuss it but they were not able to find the core of the analyzed issues. They did not concentrate on the question why "rich become richer and poor poorer", what are reasons and forms of position investing, why they obstacles preventing people in development of their human and social capital exist, what is the essence of networks based on mutual covering of breaching of the generally acceptable principles and how the structures can be reduced. We believe: if theory does not concentrate on these problems, it stays in rather academic position with little practical influence. It could be even formulated that such theory is convenient for the persons gaining from above mentioned phenomenon (e.g. members of structures based on breaching of the generally acceptable principles) – theory does not threaten them. The structures can even support such theory and its existence can be passing off as the example of free scientific discovery.

3.2 Overview of Concepts Combining Comprehensiveness, Scientific Approach and Engagement

In this chapter we will present, in the order of publishing, key Czech and foreign works about the most important concepts which are relevant for understanding the current problems. Specifically, works by R. Richta, R. Inglehart, Y. Strecková, R. Reich, F. Fukuyama, S. Huntington and P. Mason. The selection of the authors is always problematic but we primarily wanted to see the most significant attempts, both with their benefits and shortcomings. We also wanted to have a notion of the full range of alternative views of the present. In our case, we preferred the following criteria:

- Limitation to the past 50 years (in 2016 it will have been exactly 50 years since the famous work by R. Richta and his team called Civilizace na rozcestí (Civilization at a Crossroad) was published.
- Comprehensive approach.

- Significant representation of the public sector issues.

We will now characterize the most important approaches:

R. Richta and his team in the book Civilizace na rozcestí published in 1966 [13] continued the ideas presented by Marx in the "Grundrisse" manuscripts [9], while R. Richta was personally involved in their publication in Czech. The assets of the work include the teamwork and comprehensive view of development of the society. The conceptually most contributive idea (and in this respect the Richta´s performance is still up-to-date and it has overcome many later authors) is the possibility to use material conditions brought about by technical progress for development of human capabilities which subsequently operate as a factor in the economic growth. The Richta´s concept sees free time and higher consumption not only as an objective but, primarily, as a precondition for development of capabilities of a person, which operates as a source. The problem with his team´s concept consists in the fact that he was unable to identify barriers, which, under the then circumstances, prevented fulfillment of his vision or the objectively asserting tendencies.

R. Inglehart published his main work, The Silent Revolution, in 1977 [7]. The work, unlike many others published then and at present on the given topic (considerations of the direction of current development), is optimistic. A significant part of the social development is cultural development. He believes that culture is a system of attitudes, values and knowledge, broadly shared in the society and passed from one generation to another. While human substance is biologically inherent and universal, culture is learned and different in different societies. He uses the Maslowov´s hierarchy of needs and demonstrates that an ever growing role will be played by the need of love, solidarity and self-respect, along with the need of intellectual and aesthetic satisfaction (orientation at free self-fulfillment of the individual, emphasis on participation of citizens in important governmental decisions and ability to influence public affairs in the immediate proximity, participation in management at work, participation in creation of less impersonal and more humane society, in which ideas will be more important than money, quality environment). He understands postmodernization of the society as a gradual shift of human needs toward post-material needs. He proved his hypothesis with extensive empirical research. However likeable the Inglehart´s concept may seem, it has one principal shortcoming. It fails to provide a specific notion of how the satisfaction of "non-material needs" may change into the decisive factor of a "material" economic growth. R. Inglehart even does not anticipate that something like that is possible. Therefore, he is not able to create a concept of an economic system in which strengthening of the role "non-material needs" is able - figuratively speaking - make enough money to stand the competition of other trends of social development.

Y. Strecková operates with the R. Richta´s idea that it is possible to transform conditions for human development into an increase of the human potential as the most important factor of economic growth – she presents her concept of sectors enabling human development. They include education, healthcare, as well as culture, sport, social policy etc. She stresses that they are not "consumer" sectors but "source" ones. She summarized her main ideas in the text Theory of the public sector published in 1998 [14]. She significantly influenced the view of public sector issues, not only in the theoretical but also in the institutional and personnel areas. Identification of causes of the then problems, however, remained beyond the reach of her theoretical work.

R. Reich influenced the prospective of current affairs particularly by his book The Work of Nations published in 1991 [12]. The name of the comprehensive monograph paraphrases the Wealth of Nations by A. Smith. It impressed the later US president B. Clinton so much that the author became the Secretary of Labor in his government. Labor and its transformations is one of the key topics of R. Reich´s lifelong investigations. He presents his vision of future work by describing activities of "symbolic analysts" and shows a whole range of areas where this type of highly developed form of work is used. At the same time, he describes a specific historical form of how "the rich are getting richer and the poor are getting poorer", he mentions the phenomenon of investing into a special position which results in separation and, subsequently,

in economic, social and information segregation of the society. He formulated on that base a number of recommendations which he also tried to implement in practice.

F. Fukuyma is the author of the world´s best known work dealing with social vision and possibilities of its fulfillment – he actually wrote two books (The End of History and the Last Man published in 1992 - [2]) and The Great Disruption published in 1999 - [3]). In the second one he tried to answer the question why his original vision formulated in the first one failed to materialize. There are more similarities between the Fukuyama´s and Richta´s works than it may seem at and Richta´s team idealizes socialist society while F. Fukuyama does the same for liberal democracy. The Fukuyama´s vision is outlined as a long-term prediction. In his concept of the end of history F. Fukuyama sees recognition as one of the dominant needs of a man. However, the need of one´s recognition shall not be fulfilled at the expense of others. In his relatively extensive and interdisciplinary work with the indicative title The Great Disruption F. Fukuyama also attempted to find an answer to the question why his vision failed to materialize However, he was not able to find another cause than that an "uncontrollable individualism" due to unclear reasons prevails in the society at certain times.

S. Huntington, four years after the publishing of the Fukuyama ´s key work, responded to his optimistic vision with an extensive monograph The Clash of Civilizations [5], which has also become a global bestseller. He pointed to the failed materialization of the Fukuyama´s visions. He believes that religious clashes fill in the vacuum which appeared after the end of the cold war. The decline of the West is seen by Huntington as inevitable. However, he fails to complete his analysis with a political-economic reflection that would take into account economic efficiency of various systems and the related consequences for "clashes of civilizations". He provides a description of many attributes of decline of the western civilization but he completely fails to deal with the causes. Not even in the passages about "Kemalism" (i.e. combination of modernization with westernization) he disregards the fact that, under certain conditions, the adoption of Western values does not mean a decline similar to that occurring in most countries he calls the West. In this book The Third Wave published in 2008 [6]. Huntington paid attention to the causes of the decline of the West. He associated the decline of the West directly with the functioning (or with insufficient functioning and imperfections of) democracy.

P. Mason presents one of the latest integral concepts in his book PostCapitalism: A Guide to Our Future published in 2015 [10]. The author follows a broad stream of those relying on technological progress which is in its current form identified as the "the fourth industrial revolution ". It consists in a dynamic introduction of technologies that save non-creative human labor and provide more free time. He focuses particularly on information technologies, which are developing and spreading exponentially, and on their industrial applications. He presents a number of positive predictions while referring to the role of technological progress. A closer inspection, however, reveals that his concept is quite shallow as it is a result of inertial thinking at a revolutionary time. It completely lacks (unlike the fifty years old work by R. Richta and even much older K. Marx´s works) a specific notion of transformation of labor and free time into a productive economic factor. He does not realize that what is currently happening is not the "fourth improvement" of industrial revolution but a major change, which is comparable with the original industrial revolution and probably much more fundamental.

If we summarize above-mentioned books, we always see honest attempts to analyze problems facing the world in time of writing or publishing. However, although the books contain comprehensive approach, the breadth of analysis is usually insufficient. The authors very often concentrate on what was topical (on short run topics) and overlook long run tendencies (some of them from our point of view are mentioned in the section 3.3). The authors also (similarly as the examples mentioned in the section 3.1) stay on the level of analysis but do not suggest solutions of the analyzed problems including discussion why achieving solution can be difficult, who can oppose the solution, what are possible barriers of the solution and so on. If science, especially science in public sector, does not pay attention these issues, its influence stays small and it is condemned to be only academic exhibition. The topics that from our point of view

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should be contained in a comprehensive and conceptual solution of any current problem are presented in the section 3.4.

3.3 What Should Contain any Concept Analyzing and Solving Current Problems

Let us formulate some recommendations resulting from the analysis of the above-mentioned books containing conceptual approaches. Every conceptual approach applied to understand what is happening in the present time, how the current problems developed and how they shall be resolved, should include at least the following long-run tendencies:

- a concept describing how the increase of consumption and expansion of free time are becoming (trough the development of human capabilities, trough changes in the nature of work, through increase of innovation potential of the society) the most important factor of economic growth and the competitive advantage of a given community.
- an analysis of a specific form of the phenomenon of "the rich getting richer and the poor getting poorer", forms and consequences of investing into social positions and an answer to the question how to deal with economic segregation of the society.

We think that these concepts and analysis were not sufficiently mentioned both in the Czech scientific papers mentioned in the section 3.1 as in the books analyzed in the section 3.2. Both cases did not paid sufficient attention to some long run tendencies. What are these tendencies? From our point of view long run development can be characterized as follows [4]:

1. The most general cause of the current problems is the fact that it was not made a change from the existing inertial development to the society based on services associated with acquisition and retention of human and social capital (hereinafter referred to as productive services). The core of economy of modern should consists of productive services immediately associated with acquisition, retention and application of human and social capital but such change have not happened yet.

2. The economic growth may be simultaneously exponentially dynamic and sustainable or, more precisely, it must be exponentially dynamic so that it can be sustainable. The basis of that type of growth are productive services, which enable a faster professional start, better professional fulfillment , postponed high point of the career and longer horizon of the productive life.

3. The most important precondition for the transition to the economy of productive services is the engagement of entities operating in the field of productive services associated with acquisition, retention and application of human capital on the success of their clients. This condition can be guaranteed through the development of feedbacks between effects of productive services and funding of the entities that may significantly contribute to a higher dynamics of the economic growth, positive changes of its character and improvement of quality of people´s lives. The change is comparable with the industrial revolution (and probably even more profound).

4. For the assertion of the new economy, i.e. economy of productive services, it is necessary to complete a complex of mutually interconnected reforms in the sectors of social investing and social security (particularly in education, health care and pensions). The reforms anticipate full use of investment opportunities in acquisition, retention and application of human capital, which means that their implementation requires that the society should be oriented to a substantially higher level of equality in use of those investment opportunities (i.e. they are not dependent on the initial property or income of the carrier of investment opportunity).

5. Threats and opportunities created by the present time in the individual countries make it possible, along with the use of the theory, to open the way for assertion of conceptual comprehensive reforms in social investing and social security. The reforms are oriented at full use of investment opportunities associated with free

development of persons and they anticipate improvement of the market in the given area, based on the transferred price. For details about transferred price, see e.g. [4] or [16].

The issue of the public sector immediately concerns at least the last two theses. In this connection and from the viewpoint of the topic of this paper (loss of engagement of social sciences) it is worth mentioning that the theory of public finance is relatively "benevolent" to the misuse of the term "reform" , both in the Czech republic and in other EU countries. A part of the complex concept focusing on solution of the current problems cannot be only a proposal of "what should be done" but also the answer the question how to enforce such steps corresponding with objective tendencies in social development.

3.4 *What Should Be Contained in a Comprehensive and Conceptual Solution of any Current Problem*

No attempt to correct the situation can succeed without sufficient professional, comprehensive, thorough and widespread understanding of what happens in the present time. What should be contained in such vision, concept or program (i.e. what should be a rational and professionally sound base for a successful attempt for correction)? We will try to express our opinion in the form of modules:

1. Module 1: **Reflection of the time:** Are we in a typical situation and are we facing accumulated and tangled problems which, if unresolved, will increase the risks and losses (and it can ended in our fight for survival)? If the present situation is a kind of a historical excess, what are its basic parameters?
2. Module 2: **Historical tendencies:** What is the broader context of the historical development? How should we respond to the fact that possibilities of inertial development of the society have been exhausted and that the society should move to a higher level or to a new quality of its development?
3. Module 3: **Complex of reforms:** Which reforms should be implemented and in which areas? And how are the reforms mutually interconnected? What is the most important point of reforms? How are the reforms connected with the historical tendencies of development?
4. Module 4: **Subject of the change:** Who is the carrier, i.e. the subject, of the correction? How does it come to life? What will be its institutional form? And what role can be played by a theoretically substantiated concept of changes?
5. Module 5: **Motives of the changes:** Which incentives may make people force to solve the current problems? How are the incentives associated with their living conditions and existential dimension of their lives? Last but not least, what is the role of the man´s critical thinking?
6. Module 6: **Barriers of the changes:** What prevents the correction? Who benefits from the present situation and where does his power come from? Which mechanisms produce power that has caused the crisis?
7. Module 7: **Reflection (monitoring) of the situation:** What is the distribution of forces, how does the subject of changes come to existence? Short- and medium-term prognoses, including answers to the question how to respond to developments.

We think that one reason why the Czech paper analyzed in the section 3.1 had little impact on reality and why the books analyzed in the section 3.2 despite their effort about complexity stay on the level of analysis is that there were not in both cases paid appropriate attention to the mentioned modules. Especially issues of subjects, motives, barriers of the changes and reflection of the situation were not sufficiently developed. However, if any attempt to reform does not discuss these issues, it must be surprised by reality. It is very probable that attempts turn out differently than it was expected by authors of them.

4 Conclusion

The most important attributes which make (any) science scientific include historical continuity and reflection of the continuity by science (by the particular scientific discipline). A part of the reflection of scientific development is to find the moment at which a scientific discipline detected a problem, how the problem was resolved and when it turned out that, in the light of new facts, the current solution is no more applicable and that a new solution must be found or new problems must be solved. It is typical for social sciences that their subject matter - the society – keeps developing. Therefore, it is much more difficult to maintain historical continuity of social sciences. The loss of the engagement attribute may, in an extreme case, lead to loss of continuity of social sciences with reality.

To increase engagement of social sciences we must create a space for qualified communication about how we are able to describe the current problems and their causes. For this purpose, we can use the previous attempts to comprehensively and theoretically approach to understand social affairs. We believe that important part of science shall be the focus of the science on itself including the relation between what theory recommends and how it works in real life (i.e. from the viewpoint of application). Subsequently, science should use reflection of its own history (including a critical view of what we neglected in recent past).

The paper comes from above mentioned ideas. It presents based on the previous attempts to create socially engaged science what any attempt trying to solve present problems should contain, what main characteristic of the present problem are and how they are connected with public sector. We further emphasize that each analysis should be divided into several modules concentrating on reflection of the time, historical tendencies, complex of reforms, subjects of changes (realizing reforms), motives of changes, barriers of changes and reflection of the specific situation. From our point of the view, further work should be devoted to the detailed description of each module. Public sector belongs to the key part of further successful development of any society. It should, at least partly realize reforms in the sphere of productive services. The characteristic of this sphere (including its title), the role of public sector there and connected issues must be solved too. It must be emphasized that our suggestions must be proved by practical life. If an attempt containing the above-mentioned modules is successful, it can be a sign that such way brings appropriate results. Therefore any attempts about reform should be analyzed also form the point of view of mentioned modules, how they were covered and so on.

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SESSION II:
PUBLIC FINANCE

Usefulness of Tax Assignation for the Czech Tax System: The Direction of Debates on Introducing

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Abstract

The Czech Republic is the only country of the Visegrad Four that still does not apply the percentage tax designation scheme as one of the forms of financing of the non-profit sector. The mechanism has been discussed in the Czech Republic for years, however the idea has not been put to practice yet. A number of these discussions was approached as seeking a vision for the future while in other cases the discussions shifted to the political level or studies were drawn up on introducing the mechanism to the Czech legislation.The authors present the direction and development of debates on introducing percentage tax designation scheme in the Czech Republic, introduce arguments presented for and against the percentage tax designation scheme and estimate impact of the introduction in the Czech Republic. The aim of the paper is to confirm or refute the usefulness of tax assignation for the Czech tax system.

Keywords: gift; non-profit organization; tax assignation; tax designation scheme

JEL Classification: D64, H24, H31

1 Introduction

The multiple-source funding is typical for non-profit sector. Most of non-profit organisations don't produce enough of own resources for their activities and rendition of services. Non-profit organisations can by funded in different ways, a crucial source are subsidies from the public budget (the state budget, the region and municipalities budgets, or state funds). Tax assignation can be considered as another suitable option of public funding.

One of the principles of the financing of nongovernmental organizations (NGOs) is tax exemption. This principle is applied in two directions: it can refer to the legal form of the organization, or it can refer to the activities of an organization irrespective of its legal form [24]. Indirect support of public funding of nongovernmental organizations, includes the following:

- exemption from taxes (e.g., value added tax, customs fees)
- tax reductions for NGOs
- tax reductions for donors (who can deduct donations from their tax base) and others [20].

Weisbrod [28] considers tax relief as a form of compensation for this restriction on profit distribution. Other authors indicate different reasons for tax exemption, such as the fact that exemption based on the character of NGOs' activities enables them to fund charitable or generally beneficial services in education, health, social care, or other areas [1]; [5]; [7]; [19]. In recent years, the tax assignations were introduced in some new EU Member States, namely Hungary (in the hight of 2%), Poland (1%), Slovakia (2%), Romania (2%) and Lithuania (2%), while Hungary was the first country which the tax assignation introduced in 1996 [16]. Further, tax assignations are also implemented in other EU countries, such as Italy, Spain, and Portugal, where they are only intended to finance the Catholic Church or other Churches. Currently, the introduction of tax assignation is considered in Ukraine, Georgia, etc. [13].

The Czech Republic is the only country of the Visegrad Four [23]; [11] that still does not apply the percentage tax designation scheme as one of the forms of financing of the non-profit sector. The mechanism has been discussed in the Czech Republic for years, however the idea has not been put to practice yet. A number of these discussions was approached as seeking a vision

for the future while in other cases the discussions shifted to the political level or studies were drawn up on introducing the mechanism to the Czech legislation. The idea of percentage tax designations has triggered sharp arguments since the very beginning, with most NGOs adopting a positive attitude with the prospect of more opportunities to obtain funds from the State, and the vast majority of professionals, mainly economists, disagreeing with percentage tax designations.

The authors present the direction and development of debates on introducing percentage tax designation scheme in the Czech Republic, introduce arguments presented for and against the percentage tax designation scheme and estimate impact of the introduction in the Czech Republic. The aim of the paper is to confirm or refute the usefulness of tax assignation for the Czech tax system.

2 Material and Methods

This article introduces a background research and an analysis of the documents relating to the issue of tax assignations. The search starts in 2001, this year represents a major breakthrough in introducing the percentage tax designation scheme in the Czech Republic. The text analyses the following documents:

- Parliamentary Print 1194/0, the Private Members' Bill on Designation of a Percentage of Personal Income Tax Revenues for Charitable Purposes [14]
- Resolution No. 13 of the Government of the Czech Republic on the Private Members' Bill on Designation of a Percentage of Personal Income Tax Revenues for Charitable Purposes [17]
- Stenography of the 49th sitting, 25 October and 1 November 2005 [21]
- Stenography of the 46th sittings, 5 February 2002 [22].

The financial impact of the introduction of tax assignations is presented on the basis of using descriptive analysis. The text analyses the following data sources: The Tax Administration of the Czech Republic, Ministry of Finance: Number of taxpayers, The Analysis of Financing of NGOS from the Selected Public Budgets in 1999-2012.

3 Results and Discussion

3.1 Developments of Debates

The professional public mostly refused the financing of churches through percentage tax designations; the attitude of public leaders, politicians to church designations was rather negative as they perceived it as a non-systemic measure. The opinion of churches was not unanimous either. The percentage required to be designated in the Czech Republic so as to satisfy the demands of churches would have to be at least 8% according to the estimates of the Ministry of Culture from 1997. In 1997, there was a fall of the Government and the problem of funding of churches therefore remained unresolved.

The First Private Members' Bill on the Introduction of Percentage Tax Designations in 2001

In the Czech Republic, the major breakthrough in introducing the percentage tax designation scheme was achieved in 2001 when a group of Deputies headed by Monika Mihaličková and Zdeněk Kořistka (The Freedom Union–Democratic Union- Czech liberal right-wing political party) started to work on a bill on percentage tax designations. The bill was submitted to the Chamber of Deputies on 12 December 2001 and was circulated to the Deputies as Print 1194 under the "Bill to Designate a Percentage from the Personal Income Tax for Charitable Purposes" (Bill on Percentage Tax Designations) title. The bill was originally intended to allow natural persons who were the payers of personal income tax to designate up to 7% of

the decisive part of the tax, however only 1% was subsequently proposed to be designated in the final wording.

When presenting the bill, the sponsors stated four reasons why, in their opinion, the support to the non-profit sector was not optimal: i) a very low percentage of resources for the non-profit sector was allocated at the regional level, and thus regional and small organization were at a disadvantage; ii) funds were allocated only for one year; iii) compared to budgetary organisations and organisations receiving contributions from the state budget that provide the same type of services, the subsidy provided by the State was lower; iv) it was very difficult for the non-profit sector to raise funds from non-governmental sources.

In the annex to the resolution, the Government expressed its disagreement with the bill because, in its opinion, the bill i) represented a non-systemic intervention in the funding of the non-profit sector; ii) contained indirect amendments to other acts; iii) was self-contradictory since it used the concepts of "the gift", "income tax declaration", although it was not a gift factually; iv) was conceptually unclear even factually vague and misleading. The Government also questioned the expected financial impact on the state budget. However, they failed to execute their own calculation. The bill stated the amount of CZK 2-3 billion (approx. million EUR 92). in its explanatory memorandum. The bill was rejected in the first reading by 108 out of the 135 present Deputies.

The Second Private Members' Bill on the Introduction of Percentage Tax Designations in 2005

After the unsuccessful attempt of the group of Deputies in 2001, works started on a new draft law that would not contain any serious flaws and could gain political support. The Czech model of percentage tax designations was developed mainly on the basis of Hungarian experience while avoiding the main problematic areas of the amendment on percentage tax designations in Slovakia. In 2005, the Deputy Kořistka comes up with the proposal to introduce percentage tax designations into the Czech legislation for the second time. It is literally a proposed amendment which was drawn up by a group attached to the Donors' Forum (see below). Subsequently, the Deputy also uses the arguments contained in the explanatory memorandum prepared by the Donors' Forum [26]. In his arguments supporting the introduction of percentage tax designations, he repeats the problems of the non-profit sector once again as he stated them in 2001. The voting on the proposed amendment took place on 1 November 2005. Out of the present 159 deputies, 46 were for the proposal and 93 against. Thus, the proposal was not adopted.

The last active reference is from 2012 when tax designations were associated not only with non-profit organizations, but once again mainly with the church, which was perceived as problematic.

The Initiative for 1%

In 1997, the non-profit sector learns about the successfully introduced percentage tax designation scheme in Hungary and ideas about introducing a similar system in the Czech Republic start emerging. In 2002, the project titled Creating an Environment Favourable for the Development of the Non-profit Sector and Civil Society is implemented, being funded from the American Trust for Civil Society in Central and Eastern Europe.

The works were commenced with an analysis of the failure of the private members' bill of 2001, and cooperation was agreed between the Deputy Kořistka and the Donors' Forum. The Deputy provided all of the source materials he used for the bill and vice versa the Donors' Forum promised to provide the outputs of their work. Two working groups were established to operate attached to the Donors' Forum. The first was an expert group composed of lawyers, auditors, tax advisers, and experts on charitable and non-profit sector. They were supposed to prepare a specific legislative bill. At the same time, the other group was established, composed of representatives of non-profit organizations. This group was supposed to participate in commenting and enforcing the proposed legislative bills and in the cooperation on organizing the related communication campaigns. After about a year of work, the group came up with a bill that would allow for natural persons-income tax payers to designate 1% of their tax. At the same

time, the group was developing the subject-matter of the special bill on designations which describes the specific mode of functioning of the percentage tax designation scheme.

The Initiative for 1% originated on the basis of the work of the Donors' Forum in 2003. The Initiative for the 1% is an informal grouping of non-governmental non-profit organizations, supporting the introduction of the possibility to designate 1% of the personal income tax to publicly beneficial purposes. The Declaration of the Initiative for 1% was drawn up on 15 September 2003, in which non-profit organizations expressed their support for the implementation of designations. They were of the opinion that i) citizens should also decide about public funds directly; ii) the introduction of the percentage tax designation scheme would help to make the inflow of money to regions more even; iii) would mobilize citizens and contribute to establishing closer relationships between citizens and non-profit organizations.

3.2 The Arguments Presented for and Against Introducing the Percentage Tax Designation Scheme

Opinions on the introduction of the percentage tax designation scheme in the Czech Republic have not been unanimous. Both pros and cons of its introduction appear in the discussions.

Arguments Against

The economic theory does not deal with the problem of percentage tax designations in depth; the majority of economic opinions in the Czech Republic refuses percentage tax designations asserting that percentage tax designations undermine the basic purpose and principles of taxes for several reasons:

- Taxes should be nonpurpose. The nonpurpose character of taxes is seen from two perspectives. The first perspective emphasises the fact that the tax imposed on a specific tax object is not related to the financing of any area that is somehow connected to the object. The second view emphasises the fact that the taxpayer is not allowed to select the area that will be funded from his or her taxes. According to opponents, the introduction of designations would be basically in conflict with the nonpurpose character as seen from the latter point of view [10]; [9].
- Taxes are non-equivalent, no adequate volume of goods and services is provided by the State as a consideration for the individual financial performance towards the State. The introduction of designations could enable a certain degree of equivalence in the tax system [10]; [9].
- Percentage tax designations are not fair, they undermine the horizontal fairness of taxes – i.e. when there are two taxpayers with the same taxable income and one of them makes designations and the other does not, the first contributes to cover the payments of public goods less than the second taxpayer [10]; [2]; [9]; [8].
- Taxes are used to finance public goods on the basis of collective decision-making. Through tax designations, the State would favour one of the purposes that do not basically have to be funded as they are outside the State's domain. It can even be assumed that there is actually no consensus on the need to support publicly beneficial activities [3]; [12]; [9]; [22].
- The following can be listed among further arguments against the introduction of tax designations that were declared:
- Tax designations represent an anonymous form of donorship – as with public collections, the organisation will know neither who designated the tax to them nor how many taxpayers made a designation. Non-profit organizations will not be able to establish a deeper relationship with the payers of tax designations [3].
- The threat of inefficient allocation – there is a risk of inadequate or imperfect foreknowledge of taxpayers who would succumb to the media pressure of financially strong non-profit organizations. Small non-profit organizations do not have sufficient financial resources for the creation of a comprehensive marketing campaign and fail

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to reach a sufficient number of taxpayers. The media can also significantly affect the general public through preferences given to some organisations during promotion campaigns [25].

Arguments for

The arguments for the introduction of the percentage tax designation scheme are mostly formulated by representatives of non-profit organizations and their supporters; they can largely be described as non-economic arguments.

- Financial securing of the non-profit sector – the introduction of tax designations extends the scope of possibilities of financing of the non-profit sector. However, tax designations are not supposed to replace any of the existing means of support to non-governmental non-profit organizations, such as for example state subsidies or the tax relief for donors. Tax designations are a new direct aid from public sources, which complements the existing tools.
- The tool for decentralisation of the state aid - decentralisation of the state aid to non-governmental organizations can be understood in two ways: decentralization in terms of distribution of resources within the sector and between individual organisations in terms of distribution among the regions. For example, the Donors' Forum in their explanatory memorandum to the bill states that designations should lead to a greater number of recipients of financial aid, including small organisations, and secondly to more even distribution of funds to organizations operating in the regions [26].
- The method of activation and motivation of the non-profit sector – the possibility to access certain resources stimulates organisations to develop some activities, but the question is what are the activities and to what extent are they beneficial? Designations force organisations to increase the transparency when providing their services and using their resources [3].
- The manner of philanthropy education for citizens. Designations represent one of the forms of expression of support to certain activities. Percentage tax designations enabling people to decide what activities their money is to be allocated to could enhance the possibilities of involving citizens into the procedure of political co-decisions determining what the public benefit is [3].

3.3 Calculation of the Financial Impact on the State Administration and the Non-profit Sector

In this section we will try to perform a calculation of data about tax assignation. First, it is outlines the development of the amount of the designated amount.

The income of the state budget from personal and corporate income taxes has been almost continuously growing since 2003. The decline in 2006 was due to legislative changes (e.g. the reduction in tax rates for corporate income tax, accelerated depreciation in the first to third depreciation group, new support system for taxpayers with a dependent child, joint taxation of spouses, etc.). Reduction of the income tax collected in 2009 is mainly due to impacts of the financial crisis. By the end of 2007, the personal income tax had been progressive, ranging from 12 to 32% according to the level of income. Since 2008, the personal income tax has been 15% for everybody regardless of the amount of incomes (flat tax).

Table 1 shows the estimated maximum development in case the one percent tax designation is introduced. The second column indicates the data from the Tax Administration of the Czech Republic. The third column indicates the amount of tax assignation, if possible to designate 1%. Taking into account the experience from abroad, the table (fourth column) has been supplemented with a calculation of percentage tax designations that would be made if 35% of taxpayers participated in the scheme (as is usually in other contries).

Table 1. The development of income tax and an estimate of the designated sum

Year	Income tax in million EUR	An estimate of tax designations in million EUR, the maximum amount	An estimate of designations in million EUR (35%)
2005	9,146	91	3.37
2006	8,866	89	3.27
2007	10,399	104	3.83
2008	10,646	106	3.92
2009	8,169	82	3.01
2010	8,353	84	3.08
2011	8,431	84	3.11
2012	8,857	89	3.27
2013	8,818	88	3.25
2014	9,366	94	3.45

Source: [27]

3.4 Giving by Individuals

The following part of the article presents data on the amount of donations in the Czech Republic, and opens the opportunity to compare the development and the amount of money donated to the nonprofit sector by individuals. There are no systematic statistical data on individual giving available in the Czech Republic. To provide descriptive statistics of giving by living individuals, we have therefore looked at three separate indicators, which will not provide a full picture of individual philanthropy but can at least indicate trends over the past several years.

The first indicator is from data on giving in the Czech Republic that are collected by the Czech Statistical Office by means of three sources, which are described later. Two of these data sources are not publicly available. Here we present data from the Satellite Account of Non-profit Institutions (available only up to 2012). The development over time of the donated amounts is shown in Table 2.

Table 2. Uses of donations by individuals from 2005 to 2012 (in million EUR)

Year	2005	2006	2007	2008	2009	2010	2011	2012
Amount of gift	478	441	598	418	406	397	396	407

Source: [6]

The second indicator about individual giving is found in the statistics from the Ministry of Finance about applications by natural persons for tax deductions on charitable donations made to NPOs. Most individual donations in the Czech Republic are made to collection boxes in the street and through text messages, i.e. without a consequent request for a tax deduction. The development over time of the donated amounts is shown in Table 3.

Table 3. Number of taxpayers and total amount of the value of donations

	Number of taxpayers	The total amount of the value of donations in million EUR
2006	132 470	49
2007	141 093	53
2008	110 614	52
2009	113 928	54
2010	116 959	55
2011	121 216	53
2012	124 096	57
2013	138 966	55

Source: Ministry of Finance

If we compare the obtained data about the estimate of designations, about the amount of gifts from Satellite Account and total amount of the value of donations from taxpayers, we will see considerably disparity. Height of tax assignation achieves very small values of other amounts. Although the tax assignation cause loss of state budget revenue, it does not bring significant income to the nonprofit sector. The risk of crowding-out and the possibility that people replace their philanthropy by tax assignation would have a unpleasant impact.

4 Conclusion

In our opinion, the argument expressed in the Parliament of the Czech Republic when the bill on percentage tax designations was rejected, namely that "percentage tax designations are an extraneous element in the tax system" is justified from an economic point of view. In my opinion, all the arguments that speak in favour of percentage tax designations are political, not economic ones. For me, it is a proof that the issues related to percentage tax designations, as a whole, are only perceived politically, thus unilaterally. Proponents of this approach to the support provided to non-profit organizations emphasize civic awareness of members of the respective state and of course the fact that this will contribute significantly to decentralization of resources, which will improve the situation of smaller regional non-governmental non-profit organisations. Furthermore, appeals are made that it should be an option, not an obligation to designate this part of the tax to publicly beneficial purposes. From this perspective, percentage tax designations basically represent some kind of a tax relief. The evidence presented in this paper clearly shows that percentage tax designations are not a very suitable instrument of fiscal policy. Arguments supporting this claim were several. I believe that the introduction of percentage tax designations is not correct from the systemic point of view. Percentage tax designations undermine both the principles of public finance and the principles of tax fairness. Hence, percentage tax designations should be rejected not on the basis of the type of the public goods that they are related to, but on principle. It is crucial that decisions about the public goods to be financed from tax revenues are political, i.e. collective decisions. The legal institute of percentage tax designations is therefore an incoherent, illogical combination of the obligation to pay determined taxes and the option to take individual decisions about how they will be used, which denies the sense of taxes.

We believe that if the attention paid to percentage tax designations were turned to permanent support to the development of corporate and individual philanthropy, it would be more beneficial in the long run. And not only for non-profit organizations and the state budget in financial terms, but mainly for widespread distribution and "rooting" of the idea of altruism and philanthropy in the Czech Republic. The prospective introduction of tax assignations would be

beneficial for non-profit organizations only if it would not decrease government subsidies and at the same time keeping the tax allowances in relation with gifts. Only this way would create further source of their funding. This situation is, however, unlikely, because it would represent additional expenditures of the state budget. In case of reducing government subsidies or abolishment of tax allowances in respect of donations, the system of tax assignation is not appropriate. Moreover, given the complexity of the currently valid tax system, the introduction of tax assignations would mean a further element that would make it more confusing. Thus, the introduction of tax assignation would not be beneficial for the Czech Republic. A possible option is a modification of the existing tax allowances and changes in subsidy policy. However, the current deduction of gifts seems to be like a tool that is more appropriate, as it motivates taxpayers to provide additional funds for public beneficial purposes. Tax assignation merely redistributes the existing public funds, and quite costly manner.

Acknowledgements

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Introducing Accrual Accounting in the Czech Local Governments: Challenges and Risks

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Abstract

Within recent decades the new public financial management stream has brought different changes and innovations in the accounting systems of public entities globally. A trend towards the adoption of accrual accounting has been largely recognized between European countries, even in accordance with pressure exercised by the European Union, aimed at achieving comparable financial reporting. The Czech Republic has recently entered the group of countries with reformed public sector accounting (PSA) to make public finance system more realistic and accountable in accordance to EU accounting policy recommendations. Focusing on Czech local governments (CLG) the paper presents the identification of main points in mentioned implementation process in the Czech Republic and the analysis of perception and use of the related outcomes by CLG financial officers based on previous research. Moreover, the paper draws the future research agenda, assessing pro and cons of the new PSA system in the light of previous research and experiences. Recently gained results about the adoption of reform and new PSA system usefulness perceived by Chief Financial Officers and Accounting Officers in Czech Local governments show limited advantages and high degree of scepticism by these particular key actors.

Keywords: local government; public sector accounting; financial management; accounting reform; accrual accounting

JEL Classification: M41, M48

1   Introduction

Under the new public financial management (NPFM) stream a strong movement towards the adoption of accrual accounting has interested a large number of European countries (a synthesis [2]), even if some scholars have raised some doubts about the suitability of this accounting system for public sector entities, especially considering the limits of measurement of specific assets and liability [4]. The appropriateness of accrual reporting in comparison with budgeting data, almost obtained through cash accounting figures, has been also questioned by scholars [23].

However, there was a discussion, that accrual accounting have been adopted mainly for their symbolic value and to gain legitimacy [24]. Actually, several political and technical reasons played a favourable role in the move towards accrual accounting: it would facilitate the cooperation with private entities, supporting public-private partnership [13]; it would properly satisfied information needs of financial markets, allowing a better assessment of solvability [3]. In the European Union, the need to have comparable accounting figures between European countries is also playing a relevant role, especially for Eastern European countries wishing to comply as soon as possible with the European trends. The Czech Republic can be considered an example in this sense, as since 2007 a set of reforms aimed at deeply innovating the public sector accounting system has been developed in accordance with 4th and 7th EU directive, IFRS, IPSAS and the European System of Accounts [26].

Scholars have already pointed out that a certain diversity can occur in the way the accounting reforms are implemented in local governments [5], [7]. Moreover, the implementation of such reform processes brings together with costs and benefits also some questions, aspects and potential problems to be taken into account or even tackled. Some are of general or philosophy nature, some are of technical nature.

In the present research we try to identify some of these relevant issues in regard to the current experience achieved to this date in the Czech Republic in the adoption of accrual

accounting in Local Governments (CLG), relying on some preliminary findings from a previous research [16]. In particular, the aim is to analyse the perception and use of mentioned outcomes by CLG financial officers Results highlight a certain degree of scepticism among financial officer in CLG, which would deserve deeper understanding.

The paper is structured as follows. In the next section we present the evolution of the PSA in the Czech Republic, as one of the east European countries involved in a drastic change of accounting system. Based on the result of the previous pilot study, the paper highlights the concrete use of accounting data by relevant municipal officers. Furthermore, we draw a comprehensive research agenda based on secondary research, preliminary findings and existing domestic and international experience for a future comprehensive research.

2 Material and Methods

This section outlines the research approach used for the purpose of this paper.

Relevant available secondary data have been gathered and synthesised in order to grasp to what extend the adoption of accrual accounting in CLG has been perceived as an improvement. There has been used also the identification and description of the implementation process in the Czech Republic. This paper follows the pilot research on the perception of this particular reform by local governments in the Czech Republic done by the author earlier. A survey [16] was conducted sending a semi-structured questionnaire to 22 executive officers employed in Czech Local Governments (CLG). The group consists both of Chief Financial Officers (CFO) in case of bigger municipalities and Accounting Officers (AO) in case of small ones. The survey aims at assessing cost and benefits perceived by this category of internal stakeholders. For the purpose of this pilot survey 500 CFOs and AOs from municipalities of all size groups in the Czech Republic has been addressed.

There is no central database of the municipal CFO and AO contacts, therefore for the pilot research we collected 500 relevant and available mail contacts and send them semi-structured questionnaire. The response was 22 sample municipalities of different population and budget size. Within mentioned pilot [16] research we tried to take into consideration these factors whether they could play certain role in the perception of the new PSA system. There has been taken into account also other relevant pilot research on this issue.

3 Results and Discussion

3.1 Implementing Accounting Reforms in PSA in Czech Republic

Municipal financial management (MFM) in the Czech Republic is based mainly on the current relevant legislation acts – 250/2000, Law about budget rules of territorial budgets and 563/1991 Law about accounting. This particular legislation defines and provides relevant basic MFM tools and conditions in which, by whom and how they can be used. Today after the new PSA system implementation the form and shape of Czech MFM has changed according to new conditions and it is described further in other parts of this paper within the identification and description of the implementation process.

The Czech Republic has become one of the many countries worldwide that have undergone the public finance reform and associated changes in public financial management [14] and also public sector accounting (PSA) reform process. The process and associated implementation is an outcome of long-lasting and developing trends outgoing from New Public Management and its parts focusing on reforming of financial information systems including public sector accounting or financial analytics (financial health and sustainability) called also New Public Financial Management. The main goal of the outgoing reform inspired by the NPM and NPFM philosophy was to make the public sector more efficient, accountable and transparent through newly upgraded PSA system.

Within the history of similar reform processes there could be identified different approaches in the way and scope of implementation. In the case of the Czech Republic all the levels of government have been influenced within the implementation process by this particular reform which has been carried out as a part of a larger general reform of public finance system. The whole process started around 2007 and was followed by its introduction by law and implementation by 2010.

At the very beginning of the implementation process (preliminary phase) the Czech Ministry of Finance has defined general target state to be achieved by the mentioned PSA reform in public sector based on following principles [21]:

- to make state accounting in the analogy of private sector organization and considering efficiency principles and specifics of the state; improvement of accounting methods used by accounting units in public sector;
- to make conditions for efficient ensuring relevant information concerning economic situation of the state including the record of information about receivables and liabilities on the central level as well as on the lower levels of government;
- to eliminate the fragmentation of various registers and statements (reports) of accounting units connected with public budgets and property of the state;
- to ensure credibility of accounting information for the purpose of reporting and compiling of financial statements of the Czech Republic, thus to enhance the quality of the information provided by the Czech Republic out and also by individual accounting units inner;
- to make possible continuous gaining of relevant accounting information for operating management (real time decisions);
- to make accounting statements and reports available on-line by digitalizing all documents to lower administrative burden on doing accounting and control mechanisms.

The comparative ability of accounting outcomes between EU member states is among the main targets of reform processes carried out recently in East-European countries like Czech Republic. International organizations such as EU, OECD, IMF and others are promoting sound financial management and accountability and thus they are among important stimulus for these reform and implementation processes [6].

Among the real outcomes of implementation into Czech local government sector there is not only the request to each municipality on producing regularly new kind of financial documents (income statement, cash-flow and balance sheet), but also changes in accounting principles, procedures and techniques which are supposed to provide through new PSA system a true and fair view of the financial situation and performance of municipalities. This broader process also brings higher transparency when it goes hand in hand with the use of IT (i.e. digitalization of accounting records) and therefore it was supposed to reduce associated administrative burden and demanding control mechanisms. The main leading principle of this reform was the transition from cash-based to accrual-based accounting in the Czech public sector. However, it worth to notice that cash accounting still persist in the preparation of the budget. Therefore there is a difference between the balance of the municipal budget and financial result in the income statement which is reflected by the cash-flow statement but in fact not all municipalities are obliged to draw up this specific statement (this obligation to prepare cash-flow statement have only municipalities which have in previous accounting period simultaneously achieved assets over 40 mil. Czech crowns, resp. 1,6 mil. US dollars, and net turnover over 80 mil. Czech Crowns, resp. 3,2 mil. US dollars). This is a first example of the discrepancy between the reform goals and the reality in form of complexity and inner consistency disruption.

The PSA reform in the Czech Republic has started around 2007 with a wide programme of consultations, aimed at preparing a new set of accounting laws widely shared. The implementation or transition process itself has started in 2010 and is gradual.

Table 1 synthetize the path followed for innovating the PSA system in the Czech Republic.

Table 1. Implementation process overview

Phase	Issue	Period
A0	Change of the guiding chart of accounts	9/2009 - 2/2010
A1	New parts and patterns of financial statements	9/2009 - 12/2010
A2	New accounting methods and procedures	9/2009 - 2/2010, resp. 12/2010
A3	Off-Balance sheet	9/2009 - 2/2010, resp. 12/2010
A4	Transmission of accounting records	2/2010 - 7/2010
B	Depreciation and provisioning (excluding receivables)	2011
C	Transmission of statistical data	2011
D1	Consolidation - phase 1	7/2011
D2	Consolidation - phase 2	9/2010 - 7/2012
E1	Property valuation by 1 Czech crown (1 CZK)	2009-2011
E2	Property valuation by real value	1/2010 - 2011

Source: [21]

Another issue is harmonisation of PSA system according to IPSAS. There is no Czech equivalent for conceptual framework such as the one provided by IPSAS, thus all relevant standards and principles are fragmented into many different documents such as Czech accounting law or Czech accounting standards where the IPSAS standards have been in various scope and level reflected within the implementation process. However, some principles and aspects in Czech accounting legislation still different from IPSASs. For example Czech accounting regulations are designed in different way than IPSAS in the following aspects [25]:

- level of financial documents and statements formality and obligation or rigidity
- definition of accounting units (reporting entity)
- definition of the elements of financial statements
- definition of financial statements users
- methods of valuation
- overall approach (the level of approach normativity).

Overall, thanks to the implementation process of the reform, the Czech PSA and most of Czech accounting legislation and regulation are getting closer to the IPSAS and its philosophy, but the current state is still significantly different. Basically, the Czech system follows a normative approach, defining roles and method to follow, while IPSAS is moving towards a principle based approach (defined within the Conceptual Framework) even providing a corpus of accounting standard to apply.

3.2 Costs and Benefits of PSA in Czech Local Governments

One of the purposes of the paper is to assess costs and benefits perceived by internal stakeholders in CLGs in regards to the implementation of a new PSA system. We tried to collect previous research and analysis relevant to this specific issue to aggregate relevant findings and experience to be able to set up proper research agenda based on reasonable and as much as possible strong background according to the fact that this particular issue is still in the phase of preliminary and pilot studying of how smooth and successful was the implementation into Czech environment and how is it functioning. To this purpose we used some previous research made by one of the authors based on its preliminary findings [16] and we combine it with other relevant research findings from other previous research.

The analysis is based on the preliminary findings from a previous research carried out in 2015 [16] focusing on the analysis of costs and benefits associated with implementation of this PSA reform in case of Czech LG sector. This particular research at pilot phase consists of 22 interviews with experienced municipal Chief Financial Officers or Accounting Officers (mainly with long-lasting experience in accounting) from municipalities of different size. The research findings and outcomes are reported in the tables below (2 and 3).

Table 2. Costs of PSA reform – CLG sample

Costs	Yes	No	No answer	Identified costs
Costs for the general economy	36.4 %	13.6 %	50 %	Training costs, increased workload
Costs associated with accounting system	72.7 %	0 %	27.3 %	Software, Training costs, increased workload, salaries
Costs associated with budgeting	4.5 %	45.5 %	50 %	Software
Costs associated with preparation of the financial statement	22.7 %	27.3 %	50 %	Increased workload
Costs associated with cash-flow management	4.5 %	36.4 %	59.1 %	Salaries
Costs associated with performing asset management	9.1 %	31.8 %	59.1 %	Software, training costs
Costs associated with performing liabilities management	4.5 %	31.8 %	63.7 %	Software

Source: [16]

Table 3. Benefits of PSA reform – CLG sample

Benefits	Yes	No	No answer	Identified benefits
Benefits for the general economy	22.7 %	40.9 %	36.4 %	Increased accountability of officials for property management and budget execution, increased income based on the evidence and recovery of receivables, information complexity
Benefits associated with the new accounting system	31.8 %	45.5 %	22.7 %	More detailed financial statements, analytical data for the preparation of income tax return, similarities with accounting in corporations, predictive value of receivables
Benefits associated with budgeting	4.5 %	45.5 %	50 %	More detailed information for budgeting process
Benefits associated with the financial statement	13.6 %	40.9 %	45.5 %	New information, Information complexity, Satisfaction of representatives with the process of compilation
Benefits associated with cash-flow management	9.1 %	40.9 %	50 %	Stricter evidence of daily incomes, Better information for decision-making
Benefits associated with performing asset management	18.1 %	36.4 %	45.5 %	More detailed evidence, Knowledge of fair value of assets, Knowledge of depreciation,
Benefits associated with performing liabilities management	4.5 %	36.4 %	59.1 %	Internet banking connected with bank account, faster communication with suppliers

Source: [16]

Results highlight a higher scepticism by the main actors in the PSA reform in CLGs. In fact, while 72.7 % of them recognized high cost in the adoption of the new accounting system - basically due to training cost, the increased workload and the consequent need for higher cost in human resources - they do not identify high benefit. Only 31.8 % recognized that the new systems allows to obtain a more detailed financial statement and - consequently - analytical data supporting the preparation of income tax return, a higher comparability with accounting figures prepared by corporations. These results are in line with those collected and presented in another similar research [22]: out of 102 municipalities, 78% of the respondents rate the reform as unbeneficial, negative and confusing, whereas principles of management and functioning of public administration interfere with an effort to approach the accounting of business entities which operations, however, rely on entirely different principles. Moreover, 80% of respondents claim for a stronger support by the Ministry of Finance, asking for a quicker and more effective process while introducing new standards.

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Of course, approaching a different accounting system would require high investments in IT equipment and security, software and related training, as previous results revealed also in other countries [2], [22], [27].

In accordance with previous studies on the assessment of the PSA reform in specific countries and the related implementation process several risks already emerges. The case of accrual accounting implementation in UK points out that the outcome of the process with overoptimistic claims and obfuscation of costs is a complex, expensive system that has provided few benefits in the first adoption [11]. Similarly, from another case study from Belgium a higher scepticism and low perception of innovation potential rising from this PSA reform emerged when it shows the apathy of municipal councils concerning new financial statements (balance sheet and P/L statement) associated with new PSA system, the conservativeness associated with using long established budgetary documents and management tools and also the fact, that it is a deeper conceptual problem [8], [10].

Experiences established long time ago, like the case of Australia, have also highlighted that the implementation process takes about 8-10 years [28].

Assuming all the previous considerations, in the next paragraph we want to draw a research agenda focusing on the issues which deserve attention.

4 Conclusion

Scholars have widely discussed the pro and cons of the adoption of accrual accounting in public sector entities, but despite criticisms and concerns, the majority consider the adoption of accrual-based systems as an inexorable process [24], since in some way it appears as a self-evident progress and in any case it is determined almost in the political sphere [19].

Scholars have also highlighted that the successful implementation of any PSA reform depends by several determinants [28]: a wide process of consultation and acceptance, involving professionals, auditors and practitioner; a comprehensive management training; the recognition of the elapsed time needed; the IT capacity; the willingness to use incentives and penalties and - above all - the appropriate cultural approach. Looking at results collected by a survey done in regards to the usefulness perceived by Chief Financial Officers and Accounting Officers in Czech Local governments through the lens of the literature on the matter, it is clearly identifiable how the top-down acceptance of the accounting reform has produced limited advantages. The main actors of the reform reveal a high degree of scepticism. So far, a deeper research would be beneficial to understand the political and technical use of accounting figure resulting from the new PSA. Moreover, it should be noted that the coexistence of two sets of accounting numbers (cash accounting for budgeting and accrual accounting for reporting) can create further confusion by data-users (managers, politicians, citizens) [1], [12] limiting possible benefits related to the adoption of accrual-based system, as already demonstrate in other countries [8], [9].

Several groups of users would be influenced by the reform of PSA system:

- politicians and representatives (final decision-makers concerning PSA entity economy)
- officers and public servants (preparation of relevant documents and data for politicians and representatives)
- citizens and voters (supposed to be a watchdog of politicians and representatives decisions)
- other external subjects as banks, companies etc. (different motivations why to follow up PSA entity from financial perspective)

All above mentioned actors are supposed to be interested into following up financial data of public sector organization by different perspectives and purposes. Thus, we believe that further research should empirically investigate the concrete use of accounting information produced under the new PSA system in the Czech Republic by the aforementioned group of stakeholders, especially in regard to the decision-making process. A deep assessment of these

issue would have several policy implication. First of all it would allow to understand if the expected benefits which inspired the reform process have been concretely achieved. In this sense it should be assessed if the implementation of the new PSA system concretely gives the possibility to better evaluate the solvency, liquidity and performance of public entities, to favour public-private partnership, to monitor financial heath and financial sustainability of new policies [15], [17], [18], [20].

Moreover, it is necessary to investigate if there is the need to develop a set of accounting standards for public sector entities in the Czech Republic or if the adoption of a set of international accounting standards (like IPSASs or EPSAS) would represent a suitable solution. Future research needs to take into account that one of the main issue at the core of the reform was the need to comply with European requirements in PSA, and this aspect deserve appropriate attention, even in light of the harmonization approach undertaken by the European Commission.

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The Impact of Unemployment on Public Budgets. The Czech Republic Case-study

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Abstract

The unemployment is one of the factors which have a direct impact on the performance of the economy. Furthermore, there is a direct link between the unemployment rate and the government budgetary position; unemployed persons usually draw on social benefits and their tax payments to public budgets are lower. This paper aims to comprehensively assess the impact of unemployment on the condition of both the income and the spending side of public budgets. We based our quantification of the impact of unemployment on public budgets on earlier published studies. The paper's contributions are then as follows: (1) compared to the previous studies for the Czech Republic, we attempted to comprehensively capture the studied impacts, (2) we discuss the methodological problems that are associated with particular methods of the impact calculation, and (3) we propose other methods that we have developed to quantify some items. Publicly available statistical data were used to quantify the costs; another of the applied methods was the economic modelling. The results of our study suggest that the annual costs of one year-round unemployed person amounted to about CZK 207 thousand for year 2014.

1 Introduction

If labour markets were perfectly functional, there would be no unemployment other than the natural unemployment rate corresponding to the natural fluctuations of the labour force. Unfortunately, the job market is not always successful in interconnecting the available labour supply with its current demand. Problems can arise on both the demand side of the labour market (lack of demand due to wage regulations) and the supply side (inadequate qualifications or region-specific features of unemployment). Unemployment, in particular its long-term component, also results in costs on the side of the public sector, which are also studied in this paper. **It aims at using the available literature and data to quantify the amount of the costs which we can relate to the transition of a person from economic activity to unemployment**. The costs are quantified for 2014 in relation to the amount of the costs spent per the average unemployed person.

Several studies were conducted in the Czech Republic in the past several years, dealing with the impact of unemployment on performance of the economy or on public budgets as the case may be. In 2011, ***Čadil et al.*** [1] published a study the aim of which was to "*quantify the total costs that one average unemployed person generates in the general budgets of the Czech Republic*". The authors propose their own calculation methodology, which is based in particular on the practical application of Okun's law. Additional methods are the micro-economic modelling and analysis of the available public sector costs related to unemployment. The authors divide the cost per one unemployed person to direct and indirect costs. When calculating the total fiscal impacts of unemployment, they use the change in the number of (all) unemployed persons, but when establishing direct costs, they apply the concept of "the median unemployed worker". The costs per one unemployed person calculated on the basis of their methodology amounted to ***CZK 109.6 thousand*** annually. However, it should be noted that, they do not take into account some direct costs of the public sector in their calculation (the comparison will be made in the result section of the paper). Domonkos and König [5] used a similar methodology for direct and administrative costs calculation, but they came with

critique of validity of Okun´s Law for Slovakia. They used method base on propensity to consume for calculation indirect costs. According to their estimates, average costs of one unemployed range from € 4,810 to € 6,700 per year.

In 2006, Ministry of Labour and social affairs (MLSA) had "*The State's Expenses per One Unemployed Person*" study [7] drawn up by the **Elbona** company. It was an analysis of the impact of short-term and long-term unemployment which was conducted using the model of households structured by type. However, the authors themselves struggle with the aspect of variable frequency of type households in the entire target population of unemployed households. The average amount of the State's expenses is then given by the simple arithmetic average of 720 households structured by type. They construct their calculations assuming full rationality of an individual, which means that the individual gains all the benefits that he or she is entitled to in their full amount. In the area of indirect taxes, the authors work with expert estimates of distribution of consumption expenditure. In their calculations, they further work on the assumption that the unemployed will finance their consumption partly from their savings. Elbona assessed the annual costs per one unemployed person in the amount of *CZK 118.3 thousand.* Compared to the newer study, the authors have included the State's payments made to the system of the general health insurance for the unemployed person, and the average costs of the active employment policy.

To complete the list of studies in the Czech Republic, it is also necessary to state the results of the study conducted by the Czech-Moravian Confederation of Trade Unions – the expenses amounting to CZK *120.5 -254.2 thousand* [2] and the study conducted by the Ministry of Industry and Trade – the expenses amounting to *CZK 171.3 thousand* [10]; however, these studies do not provide details of the methodologies applied in them. International comparative study brings significantly higher estimates. In 2012, Maarten el al. [8] compared six European countries (Belgium, France, Sweden, Germany, Spain, UK) with yearly costs varying between € 18,008 and € 33,443 per one unemployment person.

2 Material and Methods

2.1 *The Structure of the Costs Associated with Unemployment and the Methods of Their Quantification*

In this paper, we divide the impacts of unemployment on the cost of the public sector into the following items:

- direct costs of the public sector,
- indirect costs of the public sector,
- other costs and impacts of unemployment.

Direct costs mean costs that appear in the accounts of the public sector. Uncollected taxes, especially personal and corporate income taxes, and social and health insurance contributions, or the unpaid indirect taxes imposed on common consumption of the households of the unemployed due to the decline in the purchasing power can be considered to be indirect costs of the public sector. And last but not least, profits of traders, and hence also the taxes paid by them, decrease because of the multiplication effect of the decline in the private consumption. The direct and indirect costs of the public sector are not necessarily the only costs related to unemployment. The following can also be included among the other public sector costs associated with unemployment: the cost of treating health complications associated with unemployment, possible emergence of a dependence on addictive substances (e.g. alcohol) with all the costs associated with it, the possibility of increased crime, etc. We do not quantify the other costs because it would be demanding and because the methodology would be considerably different; however, quite a detailed summary of these costs is provided in [6, 7].

Various approaches can be applied when calculating the costs of the unemployed: Macro-economic, micro-economic, accounting, or statistical. The **"*macroeconomic" approach*** (used for example in [1]) examines the impact of unemployment on the decline in GDP and related

selected taxes. This approach can be used in particular to quantify indirect costs, but also some direct ones (payments of a social nature made by the State). The **"microeconomic" approach** (used for example in [7]) calculates the impact of unemployment on public budgets using model specimens (households). This approach is particularly suitable to quantify some of the direct costs, indirect costs, but, in particular, the indirect costs of tax nature for the model individual. However, without the knowledge of the statistical frequency of unemployment, the recalculation for the average unemployed person may be a problem. This approach is also easily applicable; its results can be presented in a simple manner. The "**accounting" approach** to the calculation uses the percentage of the costs of unemployment which is directly connected with the implementation of public policies that are designed to reduce unemployment. Using this approach, you can exactly calculate a large part of direct costs which are not related to the costs of the system of the State social support and the assistance in material need. However, this method will not reveal anything about indirect costs. Its accuracy depends on the quality of the available data. The **"statistical" approach** to the calculation uses microdata from the available statistical investigations that compare the income and consumption options of similar households which differ in the number of unemployed persons. This approach enables to estimate the percentages of the direct and indirect costs (taxes and benefits) which are directly related to the unemployed person, but does not take into account other direct costs and broader tax implications for the economy. This approach, however, has not been developed in detail in the conditions of the Czech Republic.

For the quantification of the average costs of public budgets related to unemployment, we used a combination of all the above mentioned approaches. Using the macroeconomic approach, we will express, in particular, the tax costs which the State fails to collect in connection with unemployment. We will use the accounting approach, complemented by statistical approaches, to quantify the direct costs. In determining specific procedures, we will use such methods which will be easily applicable in the future and, when applied, will bring time-consistent results.

2.2 Direct Costs of The Public Sector

We divide the quantification of the average direct costs per one unemployed person into three parts: the employment policy costs; the welfare system costs; and the payments of contributions made by the State for unemployed persons. The total direct costs will be the sum of the aforementioned three parts.

The conversion of the total costs registered by MLSA in the form of simple averaging, using the number of unemployed persons according to the Labour Force Survey (see [3] and [4]) is used to calculate the direct costs of the employment policy.

The second part of direct costs is made up of the cost of the State social support system [13] and the system of assistance in material need [14]. This part of costs is calculated as a proportion of the total cost of these systems [11] which could be attributed to one unemployed person [4]. We expect the same proportion in 2014 as we see in EU-SILC 2013 data - 83 % of the Social Assistance (SA) benefits volume and 55 % of the volume of Housing Allowance (benefit from State Social Support (SSS) to which the unemployed person is entitled).

We suppose that this caused some inaccuracy when the estimate provided by us is likely to be higher than the reality. We would achieve higher accuracy by using administrative data on households of the unemployed, which are, however, non-public.

The third part of the direct costs consists of the payments of contributions made by the State for the beneficiaries of the State-paid insurance (the unemployed person) to the system of public health insurance. Since mid-2014, the monthly payment for one beneficiary of the State-paid insurance is CZK 845, which is CZK 10,140 per calendar year [12].

2.3 Indirect Costs of The Public Sector

To quantify the indirect costs of the public sector, we use the macroeconomic model which assumes that employment of the unemployed will increase the level of GDP, thereby will also

lead to increased tax collection. The following relation can be used to express the amount of additionally collected taxes when one unemployed person is employed:

$$\overline{TY_{UN}} = \overline{GDP_{UN}} * \overline{t.q.} \qquad (1)$$

Where $\overline{TY_{UN}}$ is the average tax yield in the case when one unemployed person becomes employed, $\overline{GDP_{UN}}$ expresses the average increase of GDP in the case when unemployed person becomes employed, and $\overline{t.q.}$ represents the tax quota, i.e. the percentage of increased tax yields that employment of one unemployed person will generate in the form of increased GDP. In the case of unemployed persons, we then determine two variants, the MAXIMUM and the MINIMUM variant, of their possible contribution to the GDP formation when they become employed.

The *maximum variant* assumes that the contribution to the formation of GDP made by the unemployed person who meets the "i" characteristics is the same as the contribution of the employed person of the same characteristics. The average contribution to the GDP formation of the unemployed person can be expressed as follows:

$$\overline{GDP_{UN}} = \frac{\sum_{i=1}^{n} UN^i * GDP^i}{\sum_{i=1}^{n} UN^i} = \sum_{i=1}^{n} \frac{UN^i}{\sum_{i=1}^{n} UN^i} * GDP^i \qquad (2)$$

This variant is called *the maximum variant* since it assumes that the fact of unemployment does not have any effect on the potential economic performance of the person. The value of the UN^i represents the number of the unemployed with the "i" characteristic and the GDP^i is then the contribution made by this unemployed to the formation of GDP. However, this assumption is too strong for real calculations, therefore we also construct the minimum variant in addition to the maximum one.

When *the minimum variant* is considered, the marginal income from the employment of this person is just in the amount of the marginal costs related to the employment of this person. While the marginal costs are given only by the level of the potential wage of this person (in the model it corresponds to the first decile of employees that have similar "i" characteristics; the minimum wage stipulated by law is used as the marginal value). In the model, the wage is marked as w_{LOW}^i, and *ssc* is the amount of the compulsory insurance contributions which the employer is legally obliged to pay. The schematic description of the relation is provided in equation (3). The average contribution to the formation of the GDP of the unemployed person is then once again given by equation (2).

$$GDP^i = w_{LOW}^i * (1 + ssc) \qquad (3)$$

When determining the average tax quotas, we once again work on the two aforementioned basic variants. The following equations describe how the tax quota is calculated for the determination of the amount of the taxes paid from the product created by the person who has been unemployed until the given moment. Some variables are assumed to be zero, while others are given by expert estimates. This is so because, in their case, the determination of the exact amount would not increase the accuracy of the calculation and, at the same time, their precise determination would be too complicated.

In the case of the *maximum variant* we will assume that the additional tax revenues from the GDP arising when the unemployed person is employed will be equal to the average tax quota of the respective State (see equation 4).

$$\overline{t.q.} = TQ_{CZ} \qquad (4)$$

The amount of the tax quota in the Czech Republic for the year 2013 is 34.7% [9]; for practical reasons, we will use the tax quota of 35% in the next calculations.

In the case of *the minimum variant* we construct the tax quota in another way. Here, we work on the assumption of the model unemployed person without the entitlement to

unemployment benefits, whose additional income from employment, which is also identical with the GDP created by this unemployed person, will fully turn into the payments of direct DT^i and indirect taxes IT^i and physical increase of consumption C^i (see equation 5).

$$GDP^i = DT^i + IT^i + C^i \qquad (5)$$

Additionally paid direct taxes equal to the insurance paid by the employer SSC_{er}^i, the employee himself or herself SSC_{ee}^i and the personal income tax PIT^i. At the same time, we assume (see equation 5) that the employer pays the insurance equal to 34% of the gross wage of the employee, the employee pays 11% of the gross wage, and the personal income tax is zero. The assumption of zero paid PIT is given by the situation of a single childless person.

$$DT^i = SSC_{ee}^i + SSC_{er}^i + PIT^i = w_{LOW}^i * 0{,}11 + w_{LOW}^i * 0{,}34 + 0 \qquad (6)$$

Additionally paid indirect taxes are given by the increase in consumption on the grounds of additional revenue when the person who has been unemployed so far becomes employed. These additionally paid taxes consist of the value added tax VAT^i and excise taxes ED^i. Since we do not know the exact structure of the consumption of the household that is unemployed, we assume that the additional consumption will be loaded only with the average VAT of 19% (expert estimation). In the case of excise duties, we assume that the person does not buy any other goods loaded with the tax than those the person consumes at the moment. We assume, therefore, that the extra revenue from excise taxes is zero (see equation 7).

$$IT^i = VAT^i + ED^i = w_{LOW}^i * 0{,}89 * 0{,}19 + 0 \qquad (7)$$

Finally, we work on the assumption that the additional consumption will be reflected in additional revenues of the companies selling services and goods. We assume that these additional revenues will be reflected in the profit growth of the companies and that will eventually affect the growth of the corporate income tax. At the same time, in equation 8, we assume that the additional profit is given by 5% of the consumption and the corporate income tax is 19%.

$$CIT^i = 19\% * 5\% * C^i = w_{LOW}^i * 0{,}89 * 0{,}05 * 0{,}19 \qquad (8)$$

The total tax quota of the person (see equation 9) is then given by the ratio of the sum of paid taxes and economic benefits from the employment of the unemployed person.

$$t.q.^i = \frac{SSC_{ee}^i + SSC_{er}^i + PIT^i + VAT^i + ED^i + CIT^i}{GDP^i} = 46{,}8\% = \overline{t.q.} \qquad (9)$$

The tax quota in the case of the minimum variant is higher than in the case of the maximum variant, where, however, the additional tax revenue is calculated from a higher GDP. Among the basic characteristics of the "i" that are studied for employed and unemployed persons, and for whom we know their wage characteristics, include: gender, achieved education, and the field of activity according to CZ-ISCO. The calculations show that the results do not significantly differ from each other.

3 Results and Discussion

When calculating the incremental costs, we used the interval estimates that, according to us, better represent specific situations, which may occur in the reality of the unemployed person. For a general view, we used the point estimate, which provides better interpretative options, instead of the interval estimate. In Table 1, there are the average annual costs of one unemployed person and the overall cost for the year 2014.

According to our calculations, the average cost incurred by the public sector which can be related to one unemployed person therefore oscillated around CZK 207 thousand annually in 2014. To a considerable extent, uncollected taxes (about 44%) and the costs of all social benefits (about 35%) largely contribute to these costs. Our calculation does not include any administrative costs which are not publicly available and which would slightly increase the average costs. Neither do we take into account the impact on the pension system and non-financial implications of unemployment in the total costs.

It is necessary to be careful when interpreting the resulting total costs because these were calculated by multiplying the total average costs by the number of unemployed persons. This estimate is thus based on the assumption that all the unemployed are immediately and easily employable, and that the positive economic benefit associated with their employment can be identified. These, however, can be relatively strong assumptions, particularly in the case of long-term unemployed persons with qualifications that are not demanded on the labour market.

Table 1. The calculation procedure and its results

	Total costs (in billions of CZK)	The average costs (in CZK)	Percentage
direct costs			
the costs of PEP	9.3	28,677	14%
the costs of AEP	6.4	19,737	10%
the other costs of EP	4.4	13,630	7 %
the cost of the SSS and SA	14.2	44,002	21%
payments made by the State to the system of g.h.e.	3.3	10,140	5%
indirect costs	29.5	91,052	44%
total costs	**67.1**	**207,238**	**100%**
costs not taken into consideration	• direct costs of the public sector ○ some administrative costs • impact on the expenditures of the pension system (difficult to enumerable) • non-financial implications of unemployment		

PEP = passive employment policy; AEP = active employment policy; EP = employment policy; SSS = State social support; SA = social assistance; g.h.e. = general health insurance

Source: Authors

In comparison with the already mentioned studies, our total estimate is rather higher (see Table 2), only the study of the Czech-Moravian Confederation of Trade Unions [2] admitted the costs that were even higher. Our higher estimate is given by several facts:
- First, it is an estimate calculated for the year 2014. Due to the inflation and wage growth, the nominal values are higher than they were in 2006 or 2011;
- Secondly, the estimate is based on an assessment of a complex circuit of the costs associated with unemployment. We used the circuit of costs which is wider than the one applied in the already mentioned studies; and
- Thirdly, the estimate of the average costs is influenced by the used methodology to a certain extent. Where the previous studies worked with the registered unemployment rate, the calculated average costs were lower than in the case when the average unemployment rate from the Labour Force Sample Survey was used for the calculation. The previous studies do not discuss the total cost for the economy. Their estimate would then be closer to the estimate referred to in this study.

Table 2. Comparison of the results of the quantification of the public budgets costs per one unemployed person

Study	Year of the quantification	The estimated amount [in thousands of CZK]	Costs not taken into consideration
Čadil et al.	2009	109.6	Direct costs of the public sector: • Benefits of the SSS and SA • Active employment policy • Payments made by the State to the system of general health care system • Administrative expenses • Impact on the expenditures of the pension system
Elbona	2005	118.3	• The administrative costs of PEP, AEP, payments of social benefits • A decrease in excise taxes due to a decrease in revenues and a related decline in consumer expenditures was not established because data were lacking • Impact on the expenditures of the pension system • Non-financial implications of unemployment
Ministry of Industry and Trade	2004	171.3	N/A
Czech-Moravian Confederation of Trade Unions	2009	120.5-254.2	N/A
Jahoda, Godarová	2015	207.2	• Direct costs of the public sector: o Administrative expenses • Impact on the expenditures of the pension system • Non-financial implications of unemployment

Source: Authors based on [1], [2]

When partial costs are assessed, the results of our study can be compared for example with the study by Čadil et al. [1], which however used a different quantification methodology for the estimation of the impact of unemployment on GDP. Taking into account the tax quote of 33.2% that they used, they finally calculated the total estimated loss of the public budgets per one unemployed person to be approximately in the amount of CZK 73.5 thousand, which fully meets our estimates for 2015 when the minimum method is used.

4 Conclusion

The aim of this paper was to get a comprehensive look at the issue of the costs of the public sector in the area of unemployment. When comparing our results with the results of the aforementioned studies, attention should be drawn to the differences between the applied methodologies and the scope of the costs entering the calculation. Overall, the results of the studies ranged **from *CZK 110 to 254 thousand*** of the costs of public budgets per one unemployed person annually (see Table 2).

Any time the costs of the unemployed are quantified, it is necessary to answer the question what the obtained estimate will be used for. Is it a benchmark value for the costs of maintaining the employee in employment? Or this estimate has to define the justifiable costs associated with the return of unemployed persons to the labour market. In this context, are we to distinguish a short-term unemployed person for the purposes of the calculation and compare

the costs related to this person with the costs of activation of a long-term unemployed person with respect to whom the average annual costs may be lower, but is it also true for the long-term costs?

The authors of the study recommend to continue examining the issue in question and try to refine the estimates referred to, in particular in the following cases:

- For indirect costs, we recommend to more accurately quantify the economic benefits of the employment of the unemployed person and determine the volume of uncollected taxes. This area includes, in particular, the finding of the macro-economic relation between the level of GDP and the unemployment or direct connections between unemployment and the cyclical component of the public budgets;
- For direct costs, to include the administrative costs of the operation of the social system related to unemployment, and, at the same time, exclude the costs of labour market policy, which are related to unemployment rather marginally (e.g. supervisory and regulatory activities);
- Furthermore, as regards direct costs, to assess the complex impact of unemployment on the pension system;
- And finally, as regards direct costs, the point is to analyse the options for the assessment of the amount of social expenditures, using either administrative data from relevant systems or more efficient using micro-data from the EU-SILC statistical survey (in the case of indirect taxes, it is possible to argue by analogy for the analysis of the possibility to use SRÚ system data);
- The analysis of the other costs of the public sector has been laid aside so far, and it would be appropriate to find other ways how to include these costs (or at least part of them) into the calculation as well.

Acknowledgements

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Fully Merit-based and Closed Pay-as-you-go Pension System: Basis of Reforms

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Abstract

A reform of social investment and social insurance system (especially financing of educational and health care services) necessarily requires a reform of the pension system so that this system should be fully merit-based, closed and with a single basic pension payment. This will make it possible to create a feedback among economic effects of the sectors that contribute to acquisition, retention and employment of the human capital (especially by providing educational and healthcare services) and sources of their funding. The fully merit-based pension system need not collide with meeting the principles of solidarity and simultaneously, it creates a highly motivating environment for all stakeholders (providers and users of services related to acquisition, retention and employment of the human capital). The most significant effects of some productive services related to acquisition, retention and employment of the human capital (including e.g. spa care) show in the extended zenith and particularly years of employment. In this case we talk about an intermediated use of the transferred price, because a prerequisite for evaluating the effects is a functioning of insurance markets, or precisely the market of pension and health insurance.

Keywords: pension system; human capital; transferred price; productive services

JEL Classification: H55

1   Introduction

We mostly ask the question about how the pension system should be reformed to be sustainable, motivating for those who join it, to keep certain elements of solidarity, etc. Depending on the priorities that we choose, we hold different opinions on how to reform the pension system. In our contribution, we will try for a slightly different view. We consider the key issue of the present to consist in *creating a feedback among economic effects of the sectors, which contribute to acquisition, retention and employment of the human capital, especially by providing educational and healthcare services, and sources of their funding*. We will show that an important condition for creating the above-mentioned feedback is a pay-as-you-go pension system which is simultaneously fully merit-based, fully closed and with a single basic pension payment. A fund-based system could become a similar basis if we could rely on a long-term stability of financial markets and correct behaviour of individual (mostly big) players in the markets. However, this assumption is not realistic, because radical changes through which the economy of all countries will have to go through will result in great turbulences in the financial markets and will allow unfair behaviour of big players.

Our goal is to present exact model fully merit-based and fully closed pension system with a single basic pension payment, where the following principle is applied: Its participants are motivated towards action, that secures fulfilling solidarity functions among those who are able to participate longer in labour markets, those who are not because of age, and those who achieve higher income and those who have lower income.

2   Material and Methods

To illustrate the *fully merit-based pension system* initially, we understand it as a system in which – speaking in a simplified way – everyone will receive exactly the amount, which s/he paid to the system, while the role of time in the change of the value of money is preserved.

By a *fully closed pension system* we mean such a system from where funds are neither channelled out nor channelled into. All the funds that flow in the system are taken into account in the fully merit-based principle of payments or funding of the single basic pension payment.

The system we are proposing includes a single pension payment for all participants of the system that would be financed by an equal taxation of pensions (i.e. the system would remain closed).

We will proceed as follows:

1. We will utilize a comparative approach to the recent reforms of pension systems in selected OECD countries [6].

Pension insurance systems in the world differ in many criteria, however, the basic distinctions result from the selected system of fund-raising and pension payment. Another difference is often in whether the pension system is public or whether there is a possibility of voluntary saving in private funds. The basic categorisation is the Pay-as-you-go Defined Benefit (PAYGO-DB) system and the fund-based or also Defined Contribution (FDC) pension system. With respect to the limited space, we will only focus on comparing pension systems in selected countries of the world, namely Switzerland, Chile, Hungary and Poland and we will include Sweden and Slovakia, too. This method enables us to illustrate the most important aspects of our topic in a representative way.

2. We will outline a model of a fully merit-based and fully closed pension system with a single pension payment.

Main method that we will use is gradual creation of formalized model fully merit-based and fully closed pension system with a single basic pension payment by comparing it to current pension systems. Compilation of this model will be followed by illustration of motivational effects, which would be brought by this model including illustrated presentation of these effects (Figure 3).

By the transferred price concept, we mean a price transferred from the market in which effects resulting from acquisition, retention or employment of the human capital are evaluated for contracts concerning acquisition, retention or employment of the human capital [9]. The concept of transferred price is based on the fact that a human capital contract (HCC) uses evaluations transferred from another market (e.g. professional employment market) and from another period of time (after a greater lapse of time). It universalises the term of price with respect to mutual links of individual markets. The most significant effects of some productive services related to acquisition, retention or employment of the human capital (for example, spa care, to mention an example from an area different from those considered so far) show even in the extended zenith and particularly in the lengthened years of employment. In this case, we talk about an intermediated application of the transferred price, because a prerequisite for evaluation of the effects is a good functioning of insurance markets, or precisely the market of pension and health insurance.

3   Results and Discussion

3.1 Recent Changes and Reforms of Selected OECD Pension Systems – The Comparative Approach

Switzerland was the first OECD country that declared a multiple pillar pension system as an optimal version of a system protecting pension income. "*Switzerland is often said to have a prototype of an ideal pension insurance system, not only thanks to inter-generation solidarity in the first pillar, but mainly thanks to the functioning social partnership between employees and employers and social responsibility of Swiss employers.*" [8] In Switzerland, the whole extensive social-protection system of old age security is based on three pillars: 1st pillar – basic living expenses covered by the government, payers are citizens, the employer and the government; the 2nd pillar gives preferential treatment of pre-retirement income, the payer is the employer and the citizen and the 3rd pillar is based on an individual, facultative care of each individual, the

payer is the citizen. In Switzerland, employers' partial liability for pension payments is applied. We regard this as an advantage compared to other systems.

Chile, on the contrary, uses a DC pension system as a basis. The transition to the defined contribution pension system took place relatively successfully. It was closely connected with the reform of the labour and capital markets, health insurance as well as with the taxation reform. This system survived the end of the military dictatorship and even three left-wing governments did not make any essential changes to its functioning. Success of the pension reform was contributed to by a comprehensive approach to reforms of the whole economy, a well-organised campaign, a subsequent successful start of the new pension system, strong, flexible and independent supervision and a flexible approach to regulatory measures. [4] Nevertheless, the pension system in Chile is facing big problems. Above all, it has been proved that in defined contribution systems, the labour market situation is more reflected in the pension amount and causes social problems. A low level of pension insurance coverage (though gradually increasing since the 1981 reform), the fact that only about 40% of the working population pay their contributions regularly throughout their career and use of early retirement result in low replacement ratios. The problem of low pensions concerns mostly women who more frequently have an irregular career, a lower pay, a lower retirement age and a longer life expectancy than men. Gender disparities in the pension amount become thus deeper in the new fund-based system. The main problems of pension system privatisation include high transition costs and the related risk of indebtedness. According to OECD experts [3], privatisation of the pension system without further reforms will not be sufficient to cover the costs related to demographic ageing, since the pressure on public expenditures is growing in the minimum pension scheme financed from general taxes [6]. As we can see, the pay-as-you-go DC system in its full version did not prove successful.

In Hungary, at transitions to the multi-pillar system of the pension reform, fundamental mistakes can be seen in a lack of institutional and legislative preparedness of the reforms. Hungary opted for a gradual reform, when contributions to the second DC fund pillar should have been gradually increased according to a defined timetable. However, it turned out that this proposed gradual reform did not survive due to changes in the government. In Hungary, some of the essential elements of the new system, including the issue of obligatory participation in the second pillar or the level of contribution rates, are undergoing frequent changes because of the political cycle. Hungarian experience proves necessity of political consensus for a smooth progress of the pension reform, repeatedly mentioned in research reports of the Research Institute for Labour and Social Affairs [5]. In Hungary, the transition costs were covered from internal financing (reduction of pensions from the first pillar) and subsidies from the government budget, or as the case may be by debt financing. The problem is that in Hungary, the fund pillar participants pay the same social insurance as those who do not take part in the fund pillar. A partial privatisation of the pension system is associated with the overselling risk, when the fund pillar is voluntarily joined by people that will not benefit from the participation. In Hungary, the second pillar was joined by more people than it was previously estimated, which deepened problems related to its financing. This experience proves importance of the government information campaign, which should explain the main idea behind the new pension system to the general public and provide also information which will help making a decision on participation in the fund scheme. Other problems of the fund pillar in the first years of its existence in Hungary were low rates of return related to high administrative costs [2].

The Swiss combination of the method of the pay-as-you-go financing and the method of capital cover in the pensions system reduces fiscal implications of demographic ageing. Yet, the Swiss first pillar had to undergo a reform of parameters to secure its funding in the future and even the fund system had to be adjusted to one of the population ageing factors – growing life expectancy. This need was addressed by the reform of obligatory employee insurance that introduced, among other things, a gradual reduction of the controversial factor used in the pension calculation. In addition to that, such measures have been adopted that respond to the fact that the second pillar of the Swiss pension system suffered from the recession in the financial market and most funds did not have enough capital to pay their liabilities.

In Poland and Switzerland, the new pension system was introduced equally in 1999 and newly included a system of defined contribution (DC) pension insurance. A certain amount of money was taken from the government budget, leaving thus an empty space there, and transition costs needed to be paid. Pension reforms thus rather burdened the government budget than increased pension savings and spread the risks in the pension system. We mention Poland as an example of a country, which carried out a pension reform rather successfully. In spite of the fact that problems of an administrative and technical character occurred in the first two years of the pension reform in Poland, we can consider the overall impact of the reform successful. The yield of Polish pension funds can serve as a success criterion, being several times higher than in the Czech Republic, when the annual yield in 2011–2013 was higher than 5 % [7] on average. When compared to the Czech Republic, where the average annual yield in these years did not reach 2 % [1], it is an excellent result.

Slovakia and Hungary were facing the implications of the political cycle that affected the new reform severely. The lesson learned from these countries is that a political consensus on the pension reform needs to be reached. Politicians in Hungary, Poland and Slovakia carried out a very similar reform, supplemented the pay-as-you-go pillar of the pension system with an obligatory, fund pillar; however, the respective reforms differ in the system setting of their constituent pillars.

None of the existing attempts to reform the pension system considered natural links among the functioning of all the basic systems of social insurance and social investments (i.e. also financing of educational and healthcare services in relation to pension insurance).

3.2 Draft Model of a Fully Merit-Based and Fully Closed Pay-as-you-go Pension System with a Single Basic Pension Payment

The basis of what the pension insurance system should deal with is to create a *solidarity base among those who want to and can work even in their rather old age and those who due to the growing age lose this capacity for various reasons (impact of some of them can be reduced), specifically on a basis of insurance*. Thus to create a *motivating environment to lengthen the time of voluntary employment not only for those to whom it applies immediately, but for all the direct and indirect providers of productive services who may help lengthen the time of voluntary employment of people*.

We work on the assumption that an insured event is a situation, when as a result of their growing age people lose their capacity to gain money to secure a dignified way of living by employment (for various reasons). This implies then that the main type of solidarity, which is what the system is about, is the solidarity among those who want to and can work even in their rather old age (the insured event did not occur in their case) and those who cannot (since they are already exhausted in a given branch of business) or do not want to gain money by employment. The more motivating we make the system (for all stakeholders) to lengthen the years and the zenith of employment, i.e. the more merit-based the system is, the more solidarity it is. In the long run, the point is that the pay-as-you-go system should represent the most reliable form of saving to fund people's retirement age, compare to [10].

Figure 1. Model of a fully merit-based and fully closed pay-as-you-go pension system single basic pension payment
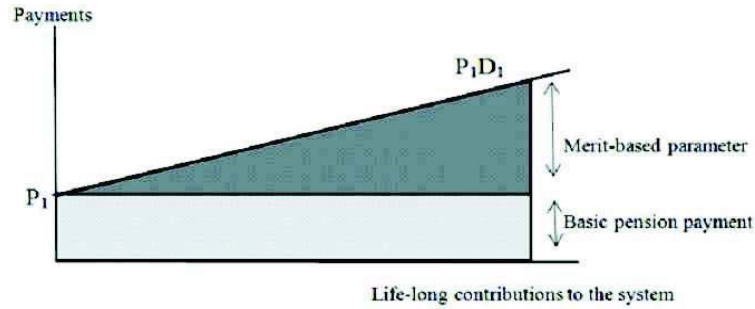
Source: Authors

The horizontal axis shows a volume of life-long payments to the system of a particular person in real values c_i (i.e. first, it is necessary to take the change of income into consideration in a more detailed model and second, money paid to the system earlier have a greater value that money paid later and last but not least, different people pay money to the system for different periods of time).

The vertical axis shows a base for calculating the pension payment (the share that the respective person can draw from the volume of money paid to the system in the current year, after subtraction of the sum, which goes to the basic pension payment). The pension itself is then calculated depending on how much money was paid to the system in the current year and the number of years for which the respective person will be receiving the pension, based on the statistically computed life expectancy, of the amount s/he paid to the system.

P_1 (for more see $(\alpha \times R_{2020})/L_{2020}$) is the basic pension payment. The volume of money for the basic payment is defined as a percentage of the volume of money paid to the system in the current year. The amount, which is identical for every person in the system, is a quotient of the volume of money for the basic payment divided by the number of people who are entitled to the payment.

$P_1 B_1$ is a line of merit-based payments. The steeper it is, the greater the merit in the system is. If it were flat and started in P_1, everybody would be receiving the same pension payment.

Let's assume that R_{2020} is total sum of money collected for the pay-as-you-go system (1st pillar) this year (e.g. 2020); α is coefficient defined as a percentage saying which part of R_{2020} goes to the basic pension payment (this basic payment will be received by everybody); $\alpha \times R_{2020}$ is amount allocated for the basic pension payment (e.g. 30% of what has been paid to the system in a given year); L_{2020} i number of participants in the system in 2020 – these are only those who are retired and draw money from the system; $(\alpha \times R_{2020})/L_{2020}$ is mount of the payment that will be received by every person who started receiving pension; $(1 - \alpha) \times R_{2020}$ is amount that will remain in the system for payment of the merit-based component; l_i is life-long amount that the insured person who retired had paid to the system; e_i is life expectancy of the respective person; l_i/e_i is expression of entitlement to the amount which the person can draw from the merit-based component. Then:

$$L/E = \sum l_i/e_i \qquad (1)$$

Sum of entitlements of all the people who draw money from the merit-based component.

$$(R_{2020} - \alpha \times L_{2020})/ (L/E) \qquad (2)$$

Entitlement "unit".

$$((R_{2020} - \alpha \times L_{2020})/ (L/E)) \times (l_i/e_i) \qquad (3)$$

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Pension that will be paid to the respective person from the merit-based component in a given year.

$$(\alpha \times R_{2020})/L_{2020} + ((R_{2020} - \alpha \times L_{2020})/ (L/E)) \times (l_i/e_i) \qquad (4)$$

Total pension of a person in the system.

At first sight, it may seem that greater merit will mean lower basic pension payments as it is shown in Figure 2.

Figure 2. Primary consequences of an increase in the degree of merit
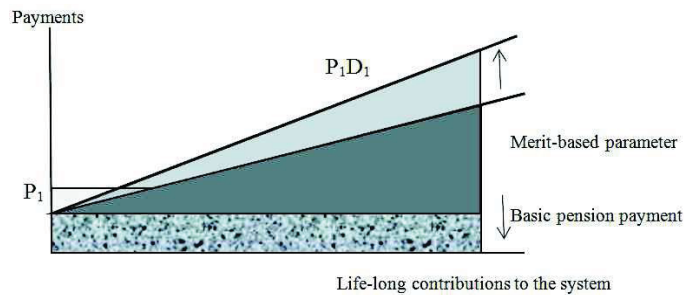
Source: Authors

The basic pension payment will decrease from P_1 to P_2, whereas those who paid to the system more will receive higher pensions.

However, we must realise that a more merit-based system is more motivating. Many people will try to pay more to the system during their life, inter alia, by:

- Searching a job more intensively if unemployed;
- Extending the years of their employment.

Consequently, the total amount paid to the system in the current year will be significantly higher. In addition, let us not forget that what is paid for basic pensions is calculated as a percentage of what has been paid to the system in total. Nevertheless, that is not all. As a result of increased motivation, there will be a decrease in the number of people who can be characterised as "unsuccessful" (i.e. those who only "ride on the back of the system"). To a certain extent, increasing the merit-based principle in the system will result in a growth of the basic pension payment. Those who are "unsuccessful" would thus be more interested in a higher merit. It is illustrated on Figure 3.

Figure 3. Effects of an increased merit parameter
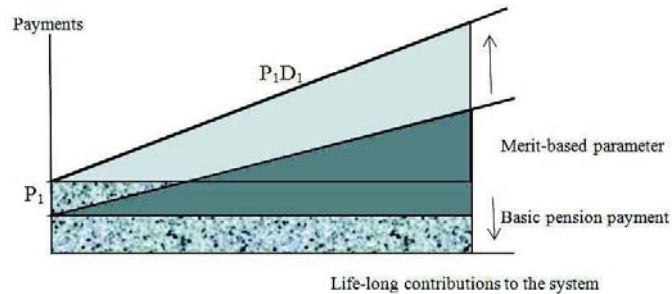
Source: Authors

How to set the merit parameter optimally? The following consideration can serve that purpose and we can call it a search for the "optimum of the unsuccessful". Let's conduct a mental experiment. Let's say that those whom we call "the unsuccessful" be interested in maximisation of the basic pension payment and not reckon with the merit-based component. However, they are rational and informed, so that they are able to opt for such a merit parameter (without profiting from the merit-based component themselves) to achieve the maximum payment by means of the basic pension payment. A fully egalitarian system (without the merit-based component) is not motivating and therefore it is not efficient either, payments to it are not big and consequently the base for calculating the basic pension payment defined as a percentage is low, that is why "the unsuccessful" are interested in existence of a reasonable and for them optimal merit parameter which makes their basic pension payment as high as possible. The optimum of "the unsuccessful" ensures a sufficient efficiency of the system. It probably corresponds to something which can be called protection against stress or "overmotivation", i.e. everybody should be sufficiently motivated, but not stressed by the system.

We have shown that if fully enclosed (pay-as-you-go pension system which is simultaneously fully merit-based, fully closed and with a single basic pension payment) system is well configured, it can also increase its solidarity function. Both between more and less successful people in terms of their income, as well as among those who are able to stay at the job market longer, and those who, due to increasing age, lose the ability to be productively employed.

Critical view of the results achieved is based primarily on comparing the current situation, i.e. from how it is conceived and how does the current pension system perform, with the possibility of partial or comprehensive reform. Here we must take into account in particular the following:

- Long-term persistent tendency toward egalitarianism and mistrust of any reforms on the part of large segments of the population.
- The complexity of the current system, which in itself accumulates partial attempts to improve or solve current problems, carried out for a long time and are certain barrier to change.
- The fact that the transparency of our proposed direction may come across someone's interests barrier.
- Lack of preparedness of the productive sector services (such as a particular area of lifelong education and health care, further spas, etc.). Actively work to extend the horizon of human productive employment.
- Overcoming objections arising from the foregoing implies in particular the following:
- To address the expressed issue comprehensively, i.e. in the context of reforms in all major regions in which operates productive sector of services related to the acquisition, application and use of human capital.
- Reveal all essential prerequisites, including the so-called hidden prerequisites that when setting model parameters have to be taken into account.

4 Conclusion

Experience from introducing and developing pension systems in various countries shows that there are many different links that need to be taken into consideration in practice, many functions that these systems fulfil and many side-effects that result from their operation. A fully defined contribution (DC) system, which was introduced e.g. in Chile, did not prove successful. Experience from Hungary, Slovakia, but from our country as well shows that a multi-pillar system, which contains the obligatory contribution pillar, did not prove successful either. If reasonable stability of the pension system needs to be ensured, the system has to be prepared and implemented by a wide social consensus. In our contribution, we have been focusing on the target idea that a well-defined pension system is a prerequisite for a good functioning of other systems of social investments and social insurance (especially financing of education and

healthcare). We have also demonstrated that a system fully based on merit need not collide with meeting the principles of solidarity.

Consequently, to define and set mechanisms which enable creating a feedback among economic effects of productive services and the financing of those who contributed to these effects, requires a fully merit-based and fully closed pension insurance system. Which is good to be supplemented, for income differentiation reasons, or precisely for creating an economic base of social solidarity, with a single social benefit.

Given that we propose a fully self-financed system (solidarity element is financed by internal resources of the system in the form of income taxes), there are no demands for its financing from other sources. The system indirectly generates positive effects on public budgets by motivating to the extending the length of economic activity and the use of human potential and the increase of the consumption of elderly, both positively affecting economic growth.

The follow-up question, which goes beyond this paper scope, is how, in relation to the functioning of the current system, a reform should be implemented, resulting in a fully merit-based and fully closed system with a single basic pension payment.

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Economic Context of the Czech Army Military Deployments and Export

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Abstract

The paper analyzes the influences of the military deployment on the export and the consequences of military spending on the public sector. The theory of the state defence economy deals with the impact of military spendings on economic variables. Several studies have confirmed the positive effects of the military spending. Using the quantitative analysis the paper is trying to evaluate the economic impact of the military deployments on the export between 2002 and 2009. Statistical data were used to identify interdependencies between Czech army spendings on the military deployment and the size of the export to Iraq destination. Although the data show a linear correlation between both variables, using the quantitative analysis - the Spearman coefficient - I did not find any correlation between the size of the spending on military deployments and the export size. In conclusion, therefore, we can say that the rSp correlation coefficient did not prove any relations between military deployments and growth of the Export to Iraq over the time period 2002-2009.

Keywords: military spending; public economy; military deployments; export

JEL Classification: H56, L53, P45

1   Introduction

The foreign policy of the Czech Republic, in accordance with the Security Strategy, focuses on preventing threats, both military and non-military, being used mainly Czech Republic's membership in international organizations. Security is related to the development of the international security environment. The Czech Republic bears its share of responsibility for maintaining peace and security in the regional and global scale in accordance with its foreign policy interests. [15] The share for ensuring international security and stability means therefore a strategic security interest of the country. Its fulfillment is in line with the foreign policy priorities of the Czech Republic and politico-military ambitions set out in the Military Strategy of the Czech Republic to deploy military forces and equipment in operations outside the territory of the Czech Republic. The security requirements of military deployments abroad are constantly growing and it is necessary to take all the economic aspects into account, not only costs, but also benefits. Military deployments of the Czech Army can be considered as a pat of economic diplomacy.[7;14] Recent years develops economic diplomacy. What is economic diplomacy? Economic diplomacy is the utilization of all national economic instruments in furtherance of the national interest when engaging with other nations. It is the new frontier of foreign policy in an interconnected world. .[10]

The approved budget for UN Peacekeeping operations for the fiscal year 1 July 2015-30 June 2016 is about $8.27 billion. By way of comparison, this is less than half of one per cent of world military expenditures (estimated at $1,747 billion in 2013). Many countries have also voluntarily made additional resources available to support UN Peacekeeping efforts on a non-reimbursable basis in the form of transportation, supplies, personnel and financial contributions above and beyond their assessed share of peacekeeping costs. Peacekeeping soldiers are paid by their own Governments according to their own national rank and salary scale. [6] Countries volunteering uniformed personnel to peacekeeping operations are reimbursed by the UN at a standard rate, approved by the General Assembly, of a little over US$1,028 per soldier per month.

2 Material and Methods

2.1 The Influence of the Military Deployments in the Host Countries and Research Methods

Methods

It is essential to analyze the relationship and the relationship between the intensity of spending on foreign deployments and development of Czech exports to selected destinations (Iraq) for verifying the hypothesis whether the military deployments support macroeconomic policy and contribute to the balanced public finances. Using simple correlation analysis we examine the above-mentioned relationship. To explore the relationships these methods were chosen: description, explanation and correlation analysis. For extending the methods used towards the evaluation of certain forms of nonlinearity the Spearman correlation coefficient (Spearman rank correlation coefficient) was used. This is a nonparametric correlation coefficient that is robust against outliers and general deviations from normality, as well as many other non-parametric methods it works only with the orders of the observed values. Using Pearson's correlation coefficient allowed to describe the linear relationship of variables X and Y, Spearman correlation coefficient describes how the relationship between X and Y is corresponding to the monotonic function that can be non-linear. It fully complies with our research. The hypothesis is following: *Military deployments of the Czech Army contribute to the exports increase to Iraq.*

The Impact of Military Deployments on the Economy of the Host Country

The basic task of foreign deployments is peace and security in the world and humanitarian assistance during natural disasters and natural disasters. Their goal is to resolve local conflicts and to prevent its escalation beyond the territory where the conflict lasts. Primarily it is to save lives, prevent and eliminate caused property damage etc. The implementing the above-mentioned goals brings economic change for both, host and home country.

For example, an average of 252 454 US troops worked each year in the period 1950 – 2000 in 94 countries around the world. During this period there was a positive correlation between the effects of US troops and economic growth of the countries where they were stationed. More than the number of deployed troops is important for the economic growth of their time working in the country. Averaged economic growth in countries receiving US soldiers values in the range of 1-3%, as measured by GDP per capita. The presence of US troops caused the average in their countries of up to 0.3% of the total annual increase in GDP. In more detail there is a correlation between the presence of US troops, respectively their number and the change (increase) in GDP in individual countries, as can be seen in Table 1.[9]

How to explain this positive effect? There are three theories explaining the above-described relationship:

- 1st Expenditure theory (Keynesian) - increase in aggregate demand.
- 2nd Diffusion theory - extension of positive changes - the development of technologies to improve the functioning, respectively institutional reform.
- 3rd Security Theory - a safe environment is a prerequisite for economic growth; in terms of ranking in first place there is stability and security and subsequently the flow of money.

Table 1. The relationship between the number of American troops sent to 94 countries from 1950 to 2000 and change in GDP in these countries

Number of countries according to number of US soldiers (>)	Average number of soldiers/year/19 50-2000 period	GDP per capita/average US dollars (current prices)		
		1960	2000	GDP change in %
10	2 219 448	4 916	16 413	3.25
10	132 199	5 603	16 872	2.82
10	14 245	4 413	12 091	2.22
10	3 271	5 561	13 954	2.07
54	723	2 515	5 557	1.33
94 countries	252 454	3 625	9 504	1.86

Source: [9]

Expenditure theory explains the growth of GDP due to increase in spending, an increase in the consumption of local products and foreign troops. The diffusion theory explains the cause of the increase in GDP due to the stabilization of institutions, rule of stabilization, monetary and financial system. In the case of exposure of US troops it may be an attempt to spread their values, particularly democracy, human rights, property rights etc. The Security theory is generally based on the presumption that increased security is a positive signal for foreign and domestic investors. The higher level of security, provided by a foreign army, means saving expenses for own defense and security with the possibility of their use in other areas of public life in domestic country. [6]This is called " strong free riding". [11]

The Impact of UN Activities on the Home Country

Table 2 demonstrates how a large share of the monthly payoff of the members of the UN in selected deployments is spent in the area of effect units. At average, a 74.5% of monthly payoff. This share is mostly spent on accommodation, restaurants, leisure-time activities and others.

Table 2. Estimated amount of monthly payoffs and expenses in home country

UN deployments Payoff/Expenses USD	UN Kosovo	UN Liberia	UN Burundi	UN Congo	UN Haiti
Monthly payoff USD	2 638	4 138	3 690	4 308	4 330
Monthly expenses USD	2 418	2 794	2 860	3 062	3 044
Share in %	91,6	67,5	77,5	71,1	70,0

Source: [4]

3 Results and Discussion

3.1 Cost and Benefits of Military Operations

All costs and benefits arising from foreign operations can be divided methodologically into direct and indirect. Direct costs are costs related directly to foreign operations. Contributions to multilateral institutions are also included, particularly to the NATO budgets. We also monitor the intangible costs, such as loss of life, both on the side of the armed forces and the civilian side.

Indirect costs mean a reflection, a byproduct of the planned, ongoing or completed conflict. Indirect costs resulting from foreign operations may include increase in costs related to security spending in the wider context, the potential decline in GDP, reduction of personal income, the increase in the state budget deficit due to funding military operations, reduction in the development of social programs, the cost of post-war reconstruction, the cost of caring for war veterans etc. Indirect costs also include fluctuations in prices of raw sources mining in the territory where ongoing military deployments. Not an insignificant portion of indirect costs is the cost of the war veterans that is funded by the state budget. [4] We must add also the costs

that are bearing by veterans and their families in the form of reduced quality of life, loss of employment and long-term health consequences.

The intangible costs of foreign deployments are related to securing the training for foreign operations, the costs in the form of depreciation of fixed assets, i.e. the costs of wear, deterioration or obsolescence of military equipment and material deployed in foreign operations of the Czech Army. These costs also include loss of life related to the armed conflict at all. However, it is very difficult to determine the economic value of the number of casualties and injuries, suffering and displaced people. The valuation of human life is very controversial, the value of human life was figured from 5 to 10 million USD. [13]

A higher level of security in the world belongs among the direct benefits. It carries benefits also for the domestic economy. Achieving a safe situation in the country is the way necessary for economic development of the country and neighboring countries, including the Czech Republic. Furthermore, ensuring the defense of the country and protecting national interests are included into direct benefits. However, it is difficult to quantify the benefits. But, what is quantifiable is the reimbursement of costs from foreign operations that accrue to the Czech Republic, and reimbursed the NATO military budget (or the UN budget). These refunds subject the deductions from the state budget. During the period 2009 - 2011 the Czech Republic was reimbursed from the NATO budget about 136 million CZK.

Indirect benefits may take the form of corporate profits from foreign direct investment (FDI). In this case the state receives benefits in the form of tax of such profits. Development cooperation in the country creates conditions not only to stabilize the flow of our investments abroad, but also to increase their volume. In terms of these issues examined we are interested in direct benefit that is our export to the certain destination. [12]

3.2 The Influence of the Czech Army Military Deployments on Export Goods and Services to Iraq

Evaluating the Impact of Military Deployments on Export Using Numerical Data

Units of the Army of the Czech Republic operated in Iraq from 2003 to 2009 in several different operations with different tasks. We can mention tasks of Military Police contingent, the coalition multinational force (MNF-I), field hospitals and training missions. Trade relations between the Czech Republic and Iraq have a long tradition. It has existed since 80's.

The chart below shows the increasing trend of export of Czech goods and services to Iraq, it is especially noticeable after 2003, when the first Czech military unit was sent to Iraq. In 2007, we see a sharp increase, which is caused by exported machines and transport equipment evaluated for more than 1 billion CZK. In 2009 and 2010, we see a surge in Czech exports. In 2011, statistical data on Czech exports show at a glance a decline compared to year 2010 (about 12%). Imports from Iraq are negligible throughout the period and the balance of the Czech Republic is highly active. [2; 8; 13]

Figure 1. Export of Czech Republic in Iraq from 1999 to 2011

Source: Author based on data from Czech Statistical Office

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Now the interdependence and its intensity between spending on military deployments and export to selected destinations within the specified period will be examined using Spearman coefficient. Due to the existence of relevant data, it was possible to examine the relationship between two variables only in the period 2002 - 2009, i.e. during 8 years. [13]

We will try to quantify the possible dependence between Czech export of the Czech Republic to Iraq (the dependent variable "Y") and the expenditures for the Czech Army units there (independent variable "X"). Pearson's correlation coefficient serves now to express the dependence. In case that the random variables X and Y are quantitative variables with a common two-dimensional normal distribution, for particular values of (x1, y1), (x2, y2), ... (xn, yn) the sample correlation coefficient is given by following:

$$ r = \frac{\sum_{i=1}^{n}(x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \overline{x})^2 \sum_{i=1}^{n}(y_i - \overline{y})^2}} \text{, (1) Pearson's correlation} $$

Pearson correlation coefficient is not suitable for this calculation, because it reflects only the linear dependence. Although the Pearson's correlation coefficient has positive result of + 0.99; i.e. values of two variables simultaneously rising, not on the basis of this simple correlation analysis to establish a clear correlation between the volume of expenditure on overseas deployments in Iraq and the volume of exported goods and services to this area in the sense that 1 CZK expended in connection with the foreign deployments automatically means 2 CZK of exports to Iraq. In the reporting period we have rather seen a trend where with the gradual limitation of "military activities" in Iraq there is an increase in the intensity of "non-military - economic activities". The gradual start-up of the economy brings renewal and restoration or creation of entirely new international economic relations. The data do not also imply that a gradual, uniform decline in spending on foreign deployments corresponded with immediate, gradual, steady increase in exports. There are obviously other factors affecting the relationship described above.

Thus we conducted verification of the hypothesis using Spearman rank correlation coefficient. It allows an extension towards the evaluation of certain forms of nonlinearity. This is a nonparametric correlation coefficient that is resistant against outliers and deviations apart from normality; it works only with the orders of the observed values. This Spearman correlation coefficient describes how the relationship between X and Y is corresponding to the monotonic function that may be non-linear unlike the Pearson correlation coefficient that describes the linear relationship of variables X and Y.

The calculating is based on the application of two-dimensional random vector of n-scale, i.e. pairs of observed values of random variables X and Y for n-operators. Next step is to define a number x_{ri} as order of x_i value within x_1, ..., x_n values arranged in ascending order, number y_{ri} as order of y_i value within y_1, ..., y_n values arranged in ascending order, numbers $\overline{r}$ and

Table 3. Spearman's coefficient of expenditure on military deployments and export to Iraq for a period of 8 years (in billion CZK)

Year	2002	2003	2004	2005	2006	2007	2008	2009
Expenditures on deployments	0.49	0.96	0.18	0.2	0.18	0.15	0.09	0.005
Export	0.014	0.13	0.53	0.4	0.48	1.57	0.73	0.26
Rank	7	8	4.5	6	4.5	3	2	1
Rank	1	2	6	4	5	8	7	3
Change in rank	-6	-6	1.5	-2	0.5	5	5	2
Squared difference	36	36	2.25	4	0.25	25	25	4
The sum of squared differences				132.5				
		1-	6	*	132.5		792	
			8	*	(64-1)		504	
				rSp	=	-0.57		
Critical value	n=8	error = 0.05	0.643	>	-0.57			
rSp	n=8	error = 0.01	0.643	>	-0.57			

Source: Author

4 Conclusion

Expenses on military deployments of the Czech Army show the impact on the development of Czech export production with a delay. This delay is about 5-6 years. Expenditures on deployment in Iraq reached its highest volume in 2003, but Czech exports to Iraq reached its peak in 2009. It is evident that the key role of Czech Army units lies in cooperation for ending the conflict, respectively for ending of the military (conflicting) phase of the operation. Because the short period and using the Spearman correlation coefficient rSp the relationship between the military deployments of the Czech Army and exports has been not demonstrated. The paper modeled 8-year-old and 12-year periods. In both cases, the rSp was not significant, correlation unproven [13]. On military deployments of the Czech Army show the impact on the development of Czech export production with a delay. This delay is about 5-6 years. Expenditures on deployment in Iraq reached its highest volume in 2003, but Czech exports to Iraq reached its peak in 2009. However, expenses related to the presence of the Czech Army in the context of military operations undoubtedly helped to stabilize the situation in Iraq and thus to create conditions for continuing development cooperation and humanitarian aid that conditioned the renewal of economic relations in turn. It is evident that the key role of Czech Army units lies in cooperation for ending the conflict, respectively for ending of the military (conflicting) phase of the operation. [5]. Because the short period and using the Spearman correlation coefficient rSp the relationship between the military deployments of the Czech Army and exports has been not demonstrated. The paper modeled 8-year-old and 12-year periods. In both cases, the rSp was not significant, correlation unproven. The outcome of the investigation confirmed military missions do not affect the economic development of the sending country.

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Fiscal Bills and Implementation Lags

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Abstract

The aim of this paper is to broaden our knowledge of the implementation lag and primarily to analyse the impact of bicameralism on it. For the aim of this research, an original dataset of fiscal discretionary bills and state budget bills was created. The dataset on the fiscal discretionary bills is based on the original list of discretionary government expenditures and revenues, which was compiled by the Czech National Bank. Our extended dataset covers 69 bills in total for the period 1994–2013. While standard implementation of fiscal discretionary measures takes 215 days, implementation without the Senate took only 143 days. The monocameral procedure used for the state budget bill takes just 103 days. For the aim of our research, we defined the original concept of fiscal procedure as a monocameral legislative process. Under the standard legislative process, 20% of fiscal discretionary bills are implemented during two quarters and 85% during four quarters. As for the suggested fiscal procedure, there would be as much as 98% of fiscal discretionary bills implemented during four quarters. Our recent analysis has inevitably led us to a cautious conclusion, that the automatic stabilizators should be preferred to the tediously emerging fiscal discretionary bills.

Keywords: fiscal discretion; fiscal procedure; government budget; implementation lags; Senate

JEL Classification: E62, H30, H70, K40

1   Introduction

The last decade has been characterized by the revival of fiscal discretionary policy. Economists, as well as politicians, are interested in the virtues and vices of fiscal discretion due to two different reasons:

i.   The formation of the Economic and Monetary Union without the parallel formation of a fiscal union has increased interest in fiscal discretion instruments among the euro–countries (e.g. Ambriško et al. [1])

ii.   the Great Recession of 2007, and subsequent low-interest-rate environment as well as the liquidity trap, has lead even conservative economists such as Feldstein [3] to mitigate fiscal discretion criticism as "in a sustained downturn when aggregate demand and interest rates are low and when prices are falling or may soon be falling".

Intentional fiscal discretion in Czech economic policy dates back to the social democratic government of Milos Zeman. The economic recessions in 1997, 2008–2009 and 2012–2013 were always connected to the new waves of the discretionary policy. However, as Friedman mentioned as far back as in 1948, the downside of fiscal discretion is its lengthy time lags:

"These lags make impossible any definitive statement about the actual degree of stability likely to result from the operation of the monetary and fiscal framework" [4].

Similarly Keynes [7] expressed some scepticism regarding the government's ability to implement crisis measures sufficiently fast:

"Organized public works, at home and abroad may be the right cure for a chronic tendency to a deficiency of effective demand. But they are not capable of sufficiently rapid organization (and above all they cannot be reversed or undone at a later date), to be the most serviceable instrument for the prevention of the trade cycle."

If the discretionary policy should smooth the cycles (as figure 1 shows), there would have to be just a slight time lag of the fiscal policy. This is valid for automatic stabilizers (see Kalckreuth and Wolff [6]) or for the theoretical concept of independent fiscal body similar to monetary Fed – *Fisc* as suggested by Šaroch et al. [10].

Figure 1. Idealized impact of fiscal discretion, when the total lag λ = 0
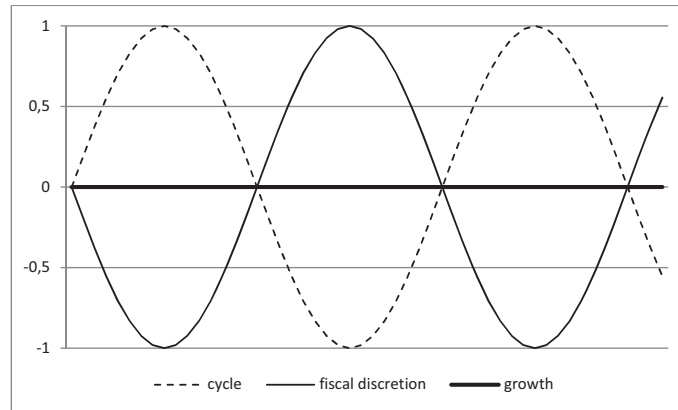
On the contrary, the total lag does not only fail to smooth the cycle, but also contributes to the significant variability of the cycle, as figure 2 clearly depicts. The most important element of the total time lag is the implementation lag. The implementation lag is defined as the length of time between the decision by economic policy makers on a response to a fundamental change in the economy and the implementation of this response to the legislation. It is also the only lag which can be influenced by the policy makers, which is highly important, especially during recessions. Nevertheless, the Czech academic economy had missed detailed research on the implementation lag until Lipovská et al. [9].

Figure 2. The impact of fiscal discretion, when the total lag λ = 8 quarters
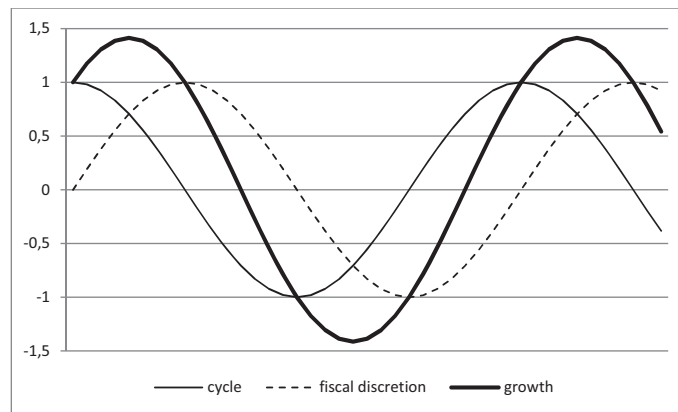
Fiscal discretion can be defined as the legal standard which is outside the budgetary process and changes the revenues or expenditures of the government budget (see Lipovská et al. [9]). For the purposes of public economics, it is therefore useful to compare and contrast the

budgetary process and the implementation lags of the fiscal discretionary bills and government budget. Results of our analysis contribute to the discussion of the *fiscal automat's* usefulness.

The aim of this paper is to broaden our knowledge of the implementation lag and primarily to analyze the impact of bicameralism on it. First, the dataset and legislative procedures are described. Second, we will compare the implementation lag of the standard fiscal discretionary bill with the implementation lag of the government budget. Great attention will be paid to the implementation lag in the Senate and factors which influenced it. Further on, the concept of fiscal procedure for the implementation of fiscal discretionary bills is introduced. Finally, we shall discuss the proposal to amend the Constitution of the Czech Republic.

2   Material and Methods

2.1 Legislative Process

Standard Czech bills are adopted in the bicameral legislative process. This *standard legislative process* is based on three readings in the **Chamber of Deputies** (*Poslanecká sněmovna Parlamentu České republiky*). A draft of the bill is sent to the **Senate** (which was founded in 1996), which can return it to the Chamber of Deputies with amendments or reject it. If approved, the bill is sent to the **President**. If President vetoes the bill, there a majority vote in the Chamber of Deputies is needed to overrule the veto. Kolář and Syllová [8] mention that there are several built-in time limits defined in four basic Acts:

- Act No 1/1993 Coll., Constitution of the Czech Republic
- Act No 90/1995 Coll., on the Rules of Procedure of the Chamber of Deputies
- Constitutional Act of Law No 110/1998 Coll., on Security of the Czech Republic
- Act No 107/1999 Coll., on the Rules of Procedure of the Senate

These built-in time limits are not rigid, so the basic (inner) implementation lag may take from 3 to 178 days. What is more, both interval boundaries are not binding. The total implementation lag can be much longer due to a long discussion between the government and opposition members of Parliament or because of a longer *vacatio legis* period. On the other hand, the total implementation lag can be also much shorter if the principle *lex retro non agit* is violated (the *vacatio legis* period is discussed by Gerloch [5]).

The most important law of the year, and the most important of the fiscal laws, – the **state budget bill** – is adopted in the monocameral legislative process excluding the Senate. The state budget proposal is introduced by the Government no later than September. If the proposal is refused, there is the provisional budget (see Act No 218/2000 Coll., on Budgetary Rules). Theoretically, the standard implementation lag of the state budget bill could last from 92 days (for a bill introduced on the 09/30) to 122 days (for a bill introduced on the 09/01). As a matter of fact, those interval boundaries are again not binding.

2.2 Dataset

For the aim of this research, an original dataset of fiscal discretionary bills and state budget bills was created. The *Dataset on the fiscal discretionary bills* is based on the original list of discretionary government expenditures and revenues, which was compiled by the Czech National Bank (Ambriško, Hájková, Soukup et al.). This original dataset includes 28 bills for the period 1995–2011. Each measurement exceeds 0.1% of GDP. Our extended dataset covers 69 bills in total for the period 1994–2013 (see Table 1). This extension is based on the explanatory memorandums on the acts as well as the Chamber of Deputies' stenographic records. Most of the acts (40%) are tax bills. Other bills are acts on the recession measures, investment subsidies or labour market regulation. Timestamps were taken from the Chamber of Deputies' archive.

The *Dataset on the state budget bills* covers the period from 1996 to 2012 (corresponding budgets for 1997–2013). The average total implementation lag would actually be shorter if state budget bills for 1999 and 2000 were excluded. Those budgets, suggested by the Zeman

government, were rejected and there was a provisional budget until February 1999 and April 2000 respectively.

Table 1. Breakdown of the datasets

Datasets	Number of bills
Fiscal discretionary bills: 1997–2013	62
Fiscal discretionary bills: 1994–1996	7
State budget bill	17

Source: Authors

2.3 Statistical Methods

Standard methods of descriptive statistics were used. The dataset was described using absolute and relative frequencies. Mean and median were used to measure the location and standard deviation to show the variability of quantitative variables. The association between two nominal variables is measured by *Cramér's V.* The strength of this dependency is evaluated according to table 2.

Table 2. Strength of dependency–classification

Cramér's V	Strength
< 0.10	very weak
0.10–0.19	weak
0.20–0.29	moderate
>0.30	strong

Source: [2]

For the data analysis, the statistical software *Statistica Cz, version 12* (StatSoft, Inc. 2013) and econometric software *Gretl, version 1.9.14* were used.

3 Results and Discussion

3.1 Implementation Lag in Senate

The length of the implementation lag in the Senate (*SIL*) is largely limited by the legislation. If the bill is approved within the standard legislative procedure and the Senate does not return the draft of the bill back to the Chamber of Deputies, then the *SIL* must not take longer than 30 days. However, the Senate's veto or the recommendations can extend the implementation lag above this limit. The implementation lag in the Senate accounts for 14% of the total implementation lag (on average).

Table 3. Total implementation lag and Implementation lag in Senate – descriptive statistics [days]

	Mean	Median	Minimum	Maximum	Standard Deviation
Total Implementation Lag	215	182	29	747	124
Implementation Lag in Senate	30	25	7	80	17

Source: Authors

The senate tends to use its *veto* more often than the President, 29% of all the fiscal discretionary bills were returned to the Chamber of Deputies in 1997–2012. If the draft of the bill was not returned to the Chamber of Deputies, the *SIL* (Senate implementation lag) was 20 days, which is much shorter than the official 30–day limit. On the other hand, the Senate's veto causes a new vote in the Chamber of Deputies, which takes much longer than the 10–day delay

anticipated by the Act on the Rules of Procedure of the Chamber of Deputies. In these cases, the implementation lag in the Senate is prolonged by 33 days to SIL = 53 days (see the Figure 3).

Figure 3. SIL– means and confidence intervals according to the result of Senate voting
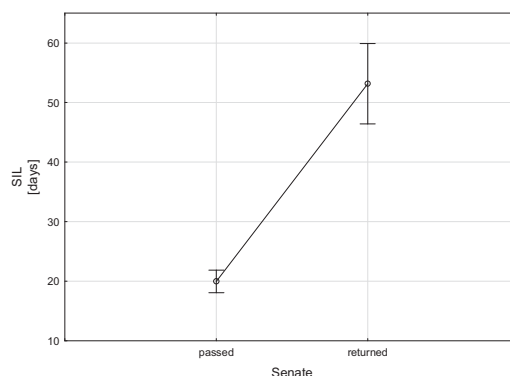
Source: Authors

The drafts of fiscal discretionary bills are rarely returned to the Chamber of Deputies if the Government has majority in Senate. The Cramer V for nominal variable *majority* and *veto* is in this case 0.32, which signals a strong dependency.

According to the Constitution of the Czech Republic, *a bill passed by the Chamber of Deputies shall be referred by it to the Senate **without unnecessary delay*** (Art. 45, Constitution, emphasis added). However, the delay between passing the bill by the Chamber of Deputies and its referral to the Senate is not defined in any law. Based on our dataset, the ***unnecessary delay*** is on average 10 days and it can, exceptionally, be longer than 20 days. There are two different sources of such significant delays (the following explanation is based on a discussion with Miroslava Němcová, former Head of the Chamber of Deputies):

- Before referring the draft of a bill to the Senate, there is overall control of the legislative process. The aim of this control is to avoid errors resulting from amendments approved during the third reading of the bill.
- After referring the draft of a bill to the Senate, the Senate organizational committee has to decide on the further legislative process **in specified time limits**. If the bill's draft is referred to the Senate individually, the Committee meeting and, consequently, the Plenum meeting would have to be more frequent and more time–consuming. On the Senate's request, the drafts of the bills are referred to the Senate in aggregate packages once or twice a month.

The second explanation significantly contributes to the implementation lag in the Senate.

Table 4 clearly shows that during the period from 1994 to 1996, when the Senate did not exist in the Czech Republic, the total implementation lag was shorter by 40 days. This is in accordance with our results for the period 1997–2013. In total, 30 days were saved due to the non–existence of the procedure in Senate and 10 days due to the non–existence of the delay caused by referring the draft bill to the Senate. However, the shortest total implementation lag can be observed for *state budget bills*. This lag of 103 days is 79 days shorter than the total implementation lag for fiscal discretionary bills. The monocameral legislative process is certainly one reason for this very short implementation lag. The second reason might be seen in the time pressure under which the bill must be approved, because of the provisional budget threat.

In the next section we will modify this monocameral legislative process into the *fiscal procedure* which will be applied on fiscal discretionary bills for the period 1997–2013.

Table 4. Total implementation lag comparison

	total implementation lag [mean]	difference against the standard procedure (1997–2013)
Fiscal discretionary bills: 1997–2013	182 days	-
Fiscal discretionary bills: 1994–1996	142 days	-40 days
State budget bill	103 days	-79 days

Source: Authors

3.2 Fiscal Procedure

For the aim of our research, we defined the original concept of fiscal procedure as a monocameral legislative process with the vacatio legis period determined by a general clause. According to the general clause, the vacation legis period is set to 15 days (see Gerloch [5]). TIL_i is the total implementation lag for the ith fiscal discretionary bill ($i = 1, \ldots 62$), TIL_i^* is the total implementation lag under the fiscal procedure, SIL_i is the implementation lag in the Senate, $LVIL_i$ is the vacatio legis period and β_i is the delay caused by referring the ith fiscal discretionary bill to the Senate. The hypothetical total implementation lag TIL_i^* is therefore

$$TIL_i^* = TIL_i - SIL_i - (LVIL_i - 15) - b_i, i = 1, \ldots, 62 \qquad (1)$$

When applied on the original dataset of fiscal discretionary bills from 1997 to 2013, the hypothetical total implementation lag is $TIL_i^* = 155$.

Under the standard legislative process, 20% of fiscal discretionary bills are implemented during two quarters and 85% during four quarters. As for the suggested fiscal procedure, there would be 25% of fiscal discretionary bills implemented during two quarters and as much as 98% during four quarters (see Figure 4). The fiscal procedure would significantly reduce the total implementation lag, however, this lag would still be longer than the total implementation lag of state budget bills.

Figure 4. The accumulated ration of fiscal discretionary bills approved under the fiscal procedure and standard procedure
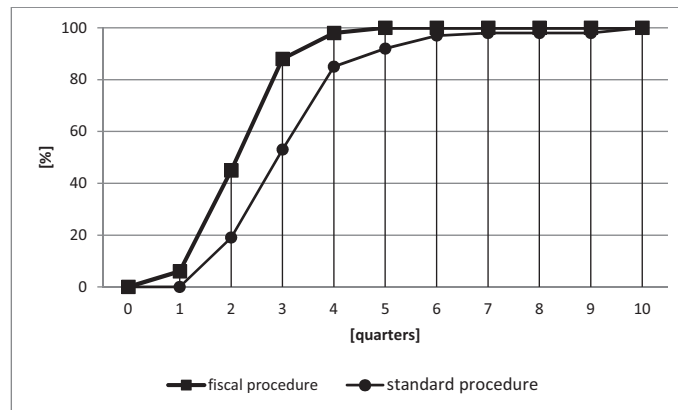
Source: Authors

In 2014, the head of the Senate Milan Štěch introduced a proposal on changing Article 46 of the Czech Constitution. According to Article 46, *the Senate shall consider a bill referred to it and decide thereon* **within thirty days of the day the Bill was sent to it** (Art. 46, Constitution, emphasis added). The intended Constitutional amendment should prolong the legislative period for the Senate from 30 to 40, 50 or even 60 days. The main aim of this is to improve the quality of legislation with better amendments, which could be accepted in the Chamber of Deputies.

As we have seen above, the Senate returned 29% of drafts to the Chamber of Deputies (so the stable ration of the approved drafts is $\omega = 0.71$), which prolongs the implementation lag in the Senate by 33 days. If the Constitutional amendment is approved and the legislative period prolonged by ϑ days, the implementation lag in the Senate would be:

$$SIL' = \omega(20 + \vartheta) + (1 - \omega)(20 + \vartheta + 33) = 53 + \vartheta - 33\omega \qquad (2)$$

Table 5 shows the impact of this on the total implementation lag, i.e. the implementation lag in the Senate and the ratio of the SIL' to total implementation lag.

Table 5. The impact of the intended Constitution amendment

ϑ	Prolongation	SIL'	TIL	$\varphi = \dfrac{SIL'}{TIL}$
0	30	30	215	14 %
10	40	40	225	18 %
20	50	50	235	21 %
30	60	60	245	25 %

Source: Authors

4 Conclusion

In this contribution, the impact of bicameralism on fiscal discretion implementation lag was tested. While standard implementation of fiscal discretionary measures takes 215 days, implementation without the Senate (form 1994 to 1996) took only 143 days. The monocameral procedure used for the state budget bill takes just 103 days. However, the model of hypothetical *fiscal procedure* revealed that the total implementation lag is not influenced purely by the legislative delays (the implementation lag under the fiscal procedure would be 155 days). On the other hand, it is significantly influenced by political games and strategies. As Thomas [11] suggested, the long implementation lag in the USA is caused by the approval process which includes both chambers of the Congress and the President.

This contribution by no means wants to suggest that the legislative process should be made shorter and simpler. The main aim of a two-chambered Parliament is to maintain a check–and–balances system. This can be illustrated by the situation when there is a governmental majority in both chambers. In cases such as this, the implementation lag is extremely short (see Lipovská et al. [9]). If is this two-stage control is weakened, it *prolongs* the implementation lag in two ways:

- The members of the only existing chamber would spent more time controlling and commenting on the bills (compare with the relatively long period between the draft of the bill is referred to the Senate).
- The president might substitute for the check–and–balances role of the Senate, so the implementation lag by the President would be much longer than the current 11 days.

As for *political games*, the implementation lag in the Senate can be just one way how to justify the second chamber's existence. The requirement on the longer legislative period in the Senate (as discussed in section 3.3) could be seen as an effort by the Senate to stress its crucial role, which is often considered to be redundant.

It would be fruitful to devote any following research to two research questions. Firstly, the length and structure of the implementation lag in Slovakia should be studied. The Czech Republic and Slovakia have a similar institutional background and are both parliamentary republics. However, Slovakia lacks a Senate, so it offers a natural laboratory for comparing and contrasting the role of the Senate on implementation lags. Secondly, the impact of implementation lags on the real economy must be analyzed. If the Senate slows down the implementation of fiscal discretionary bills, we must ask if the fiscal discretion really is the best method with which to cope with recessions. Our recent analysis has inevitably led us to a cautious conclusion, that the automatic stabilizators should be preferred to the tediously emerging fiscal discretionary bills.

Acknowledgements

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Modelling of Municipality Indebtedness Evaluation at Regional Level

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Abstract

The objective of this article is to evaluate and analyse municipal indebtedness of the Czech Republic (CR) municipalities (with the exclusion of the capital city Prague) from the point of view of their size - both for the entire CR for year 2013 and the NUTS2-Northeast (NUTS2-NE) region for the years 2010, 2011, 2012 and 2013. Selected indicators have been used to evaluate municipal debt (MD). One of them is the "budget responsibility" indicator. This indicator will be compulsory for municipalities based on approving the CR constitution law. Another indicator is the share of debt in the total municipality assets. We have used a system approach for executing this analysis.

Keywords: data analysis; indicators of indebtedness; modelling; municipal debt; North-east Cohesion Region

JEL Classification: H74, H81, C88

1 Introduction

There are 6 248 municipalities in the CR. Their size structure, however, is quite unusual compared to other countries. Eighty percent of municipalities have less than 1000 inhabitants, but only 20% of the population lives in these municipalities. Most inhabitants live in the four largest cities (Prague, Brno, Ostrava and Pilsen). Other countries with this size structure in Europe are only Slovakia, France and Portugal. This size structure complicates not only the financing of municipalities, but also the quality of self-government of small municipalities [5]. This also concerns the problem of municipal indebtedness in CR. The total volume of the CR MD does not represent a serious problem from the overall public finance viewpoint. The indebtedness itself and the volume of the debt may represent a risk just for some individual municipalities, mainly for small municipalities. The risk of getting into unhealthy debt has a couple of sources and reasons. Some are valid generally, some are the result of the environment in which CR municipalities function [3, 9, 10]. Unlike in other countries, there is no direct regulation applied to MD in the CR [15]. The Ministry of Finance of the CR (hereinafter "the MFCR") has been using, since year 2008, a system of informative and monitoring indicators [12]. Currently the Chamber of Deputies Parliament of the CR is hearing a draft of a constitutional law on budget responsibility that shall regulate the indebtedness of all public finance budgets elements which means that this law shall apply also to municipalities [8]. According to the draft, the share of debt should not exceed 60% of the average income in last 3 years.

Some European states have already taken steps or are currently taking steps to directly regulate and to limit local government debt - these steps are represented by adopting the National stability pacts (Austria, Italy, Spain, Greece, Germany) [18]. Other countries hope to improve local government financial management [17] and MD decline by executing institutional reforms and consolidation of municipalities e.g. Switzerland [4], Denmark [6] and Slovakia [14].

The objective of this article is to evaluate and to analyse the indebtedness of municipalities from the NUTS2-NE cohesion region. This cohesion region includes Královéhradecký (KHR), Liberecký (LIR) and Pardubický region (PAR). The real data was used for the years 2010, 2011, 2012 and 2013.

2 Material and Methods

For evaluating the indebtedness of selected sample of the cohesion region NUTS-NE municipalities we had to create a model for evaluating the indebtedness of all municipalities in

CR based on selected indicators. Comparing the data gathered for all municipalities in CR with data from the selected sample let us evaluate if both models correspond with each other.

2.1 Problem Formulation

The model of evaluation of municipality indebtedness works with real data for year 2013 for 6 247 municipalities in the CR [13]. The capital city Prague has been omitted since Prague has a very specific legal situation – it is both the municipality and the region at the same time. It uses the special legislation (the Act on the City of Prague, No. 131/2000 Coll.); there is located, at the same time, also the administrative headquarters of the Central Bohemia Region; in year 2013 the indebtedness of Prague was 34.1 billion CZK, therefore all of the remaining 6 247 municipalities had together total debt 58.1 billion CZK. The data matrix were put together databases of the MFCR and of the Czech Statistical Office (CSO) [2, 12]. The data about municipality revenues, MD, municipality property have used from these databases. The information about number of inhabitants in individual municipalities has been taken from area-analysis background data.

The data matrix is composed and calculated for 6 274 objects (municipalities). Vector o = { o_1, o_2, ..., o_{6247} }, o_i is i-th object (municipality) can be characterized as a sextuplet by the following way:

$$1. \quad o = \{ x, a, b, c, k, d \} \qquad\qquad (1)$$

where x is the vector of absolute indicators, a is the vector of relative indicators calculated from the absolute indicators x, b is the vector of median values of the relative indicators a, c is the vector of "risky indebtedness" indicators, k is the value representing the size category of the municipality and d is the percentage of municipalities with debt in the given category k [13].

The elements of x = { x_1, x_2, ..., x_5 } are defined in the following way: x_1 is number of inhabitants of a given municipality, x_2 is a given municipality total revenues (tax transfers, non-tax transfers revenues, capital revenues and received subsidies), x_3 are "selected" (tax, non-tax and received subsidies) of a given municipality revenues, x_4 are the municipality total assets and x_5 is the total amount of the MD.

The elements of a = { a_1, a_2, ..., a_6 } are defined in the following way: a_1 is the MD per one inhabitant (x_5/x_1) in CZK, a_2 is the total municipal revenues per one inhabitant (x_2/x_1) in CZK, a_3 is the "selected" municipal revenue (without the influence of the nonrecurring capital revenues) per inhabitant is (x_3/x_1) in CZK, a_4 is the share of the total debt to the municipal revenue (x_5/x_2) in %, a_5 is the share of the total debt to the "selected" municipal revenues (x_5/x_3) in %, a_6 is the share of the total debt to municipal assets (x_5/x_4) in %. The indicators a_1, a_2, a_3, a_4, a_5 reflect the various population sizes of municipalities and are related to resources that can be used to repay MD. The indicator a_6 (the share of debt in the total municipality assets) is related to the municipality total assets.

The elements of b = { b_1, b_2, ..., b_6 } are calculated for individual municipal size categories, where b_i is the mean value of a_i, where i = 1, 2, ..., 6. It means that b_1 is the mean value of a_1, b_2 is the mean value of a_2 etc. The elements of c = { c_1, c_3 }, where c_1 is the number of municipalities in a region over the 60% limit from a_4, c_3 is the number of municipalities that are over the 25% limit from a_6. The coefficients a_4 and a_6 represent certain indicators of cautious indebtedness of a municipality. The value of the indicator a_6 (share of debt to the total assets) should not exceed the 25% limit. This indicator shows what share of the municipality assets is covered by external resources while it is valid that the lower the value of this indicator the better for the municipality. The MFCR follows this indicator as one of the indicators used to monitor municipal financial management [12]. The indicator a_4 (the share of the total debt in the total revenues) is an indicator that shall be used for the evaluation of municipal management responsibility. If any MD is larger than the 60% of the average of municipality revenues for the last 4 years, then such municipality must start reducing its debt by 5% of the difference between the amount of its debt and those 60% average of its revenues for the last four budgetary years [11]. In the model

design [13] for all municipalities in CR we used only the index calculated for 2013 for simplification (i.e. share of total 2013 debt on total revenue in 2013).

To categorize municipalities by their size is possible and can be done according to various needs and approaches [2, 12]. The division of municipalities into 7 size categories for k = {1, 2, ..., 7} is used by the following way: Category 1 equals the size of a municipality from 1 to 199 inhabitants, 2 is from 200 to 399, 3 is from 400 to 599, 4 is from 600 to 999, 5 is from 1 000 to 1 999, 6 is from 2 000 to 9 999 and category 7 is 10 000 and more.

The attributes values of the model (see Tab. 1) for the whole CR show that the mean value of indebtedness per inhabitant (b_1) reached 5 742 CZK. When comparing the value of the total municipal revenue per inhabitant attribute (b_2) and the selected revenue per inhabitant (b_3) there is demonstrated a slightly lower level of this attribute in all of the observed categories. The influence of capital revenues is no longer so prominent as it was in the 90s when municipalities privatized a lot of municipal property. What is interesting is the finding that revenues per inhabitant are the highest in the smallest municipalities – the size category of up to 200 inhabitants. This is the result of the taxes allocation scheme that still provides, despite the amendment of the relevant legislation, such high tax transfer revenues to these types of municipalities. The mean value of the share of debt to the total revenues (b_4) does not exceed in any of the size categories the "critical" 60% value (indicator c_1). The same situation is with the debt to total assets indicator (b_6) where municipalities do not even closely reach the critical level in any of the categories (c_3).

Table 1. Attributes' mean values for individual municipal categories and for the CR total

Attributes								
k	p	b_1 [CZK]	b_2 [CZK]	b_3 [CZK]	b_4 [%]	b_5 [%]	b_6 [%]	d [%]
1	1453	3 203	22 823	21 251	13	14	2	20
2	1524	3 574	19 284	18 435	18	19	2	34
3	890	3 312	17 808	17 026	18	19	2	47
4	954	3 114	18 593	17 823	17	18	2	51
5	744	3 542	18 548	17 902	19	20	3	63
6	552	4 008	19 034	18 367	21	22	3	82
7	130	4 791	20 162	19 361	23	24	3	91
CR	6247	5 742	20 563	19 751	28	29	4	44

Source: [13]

When observing the results from the municipality size viewpoint we can state that the share of municipalities with debt is growing with the growing number of inhabitants in such municipalities. The lowest percentage share of municipalities with debt can be found in the first category (1-200 inhabitants). Municipalities of the size 10 000 plus inhabitants have 91% share of municipalities with debt. All municipalities with 50 000 plus inhabitants have debt.

For more detailed analysis we have selected a sample of municipalities from NUTS2-NE from the matrix. The data matrix has 1 114 objects.

KHR and PAR municipalities have similar size structure while LIR municipalities have different size structure. This is the result of different historic development and of the geographical location of LIR. There are in total 448 municipalities in KHR, 451 municipalities in PAR and only 215 municipalities in LIR. The municipal structure in KHR and PAR corresponds with municipal structure of the entire CR. The most frequent size of municipality is the category size 1 and 2. In KHR the share of size 1 and 2 municipalities is 53% (it is 98 respectively 139 municipalities). In PAR region the share is the same as in KHR (it is 106 respectively 131 municipalities). In LIR municipalities of size 1 and 2 represent only 37% of the total number of municipalities (it is 28 respectively 52 municipalities).

Data quality (accuracy, completeness, consistency etc.) has an impact on modelling results. Outlying data can have a considerable influence on the result of analysis [1]. For further analysis we have removed the outlier values [7, 16]. The data matrix has 1 001 objects (that means 113 municipalities were removed from the NUTS-2 NE sample). In Tab. 2 we can see attribute a_1 for NUTS-2 NE after removing the outlier values for the mean value of the debt per inhabitant, the

maximum value and the standard deviation, the number of municipalities in a given region p and the number of municipalities in a region for c_1 and c_3 [13].

The maximum amount of debt per inhabitant is comparable in all three regions (it is the highest in PAR) and also the rate of variability, which is expressed by the standard deviation, is comparable in all three NUTS2-NE regions. It is the highest in PAR region. Compared to the mean value of indicator a_4 for the whole CR the values in NUTS2-NE regions are much lower. Values of these indexes are counted for the total number of municipalities (indebted and non-indebted municipalities - after removing the outlier values). The percentage of municipalities with zero debt is the same in KHR and PAR - it is 40%. In LIR there is 20% of municipalities with zero debt. The values of the coefficients that indicate unhealthy indebtedness are zero for all regions in case of c_3. This is the result of the simplified calculation that works only with revenues of 2013. within the c_1 indicator, 15 NUTS2-NE municipalities exceed the 25% share of debt on the assets [13].

Table 2. Values of attributes in NUTS2–NE without outlier values

| Region | Attributes | | | | | |
	Mean of a_1	Max of a_1	StdDev of a_1	p	c_1	c_3
KHR	1404.9	9482.0	2476.5	398	7	0
LIR	1243.0	9467.2	2284.3	206	2	0
PAR	1468.7	9995.5	2709.1	397	6	0

Source: [13]

2.2 Model Design

The proposed regional model of municipality indebtedness evaluation in Fig. 1 illustrates the option to evaluate NUTS2-NE municipality indebtedness by size categories k.

Figure 1. Regional model of municipality indebtedness evaluation
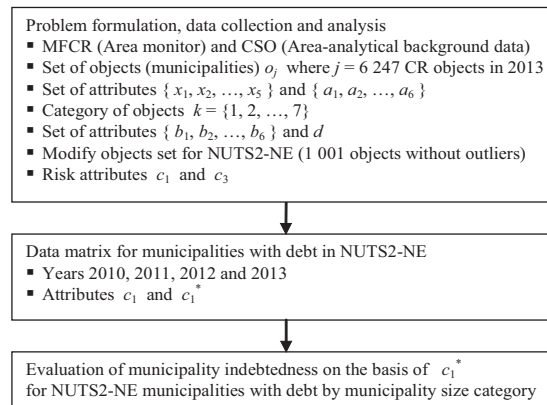
Source: Authors

The proposed regional model of municipality indebtedness evaluation works with a new coefficient c_1*. The value of c_1* is calculated the same way as in the draft of the budget responsibility bill – it represents the share of debt on the average of total revenues of the municipality in the years 2010, 2011, 2012 a 2013 [8, 13].

3 Results and Discussion

The Tab. 3 shows calculated medians of c_1* indicator for each size category of municipalities in three NUTS2-NE regions. The analysis provides more realistic view of the municipality indebtedness than the simplified indicator c_1. For the evaluation, we use similar characteristics as in Table 2 (min values, max values and standard deviation) shown in percentage. For example for the smallest municipality category (up to 100 inhabitants) in KHR region (90 municipalities in total) the average value of the indicator is 73%, which means that there are municipalities that exceed the required 60% value of the indicator c_1* even after deducting the outliers values. Mean value of this indicator is 3.6% in given category, the rate of variability in given category is determined by StDev and its value is 12.1%. In other regions (LIR a PAR) municipalities in this size category don't exceed the 60% value. In other size categories, the municipalities exceed the required c_1* indicator mainly in PAR region (size categories 2, 3, 4 and 5). In the largest size category 7, the 60% value is not exceeded in any region, the maximal value being 40% in KHR and PAR region, 32% in LIR region. This reflects the fact that even though almost all large municipalities are indebted, their budget is large enough. Therefore, the share of debt on the average total income doesn't exceed the critical 60% level.

Table 3. Volume of c_3* debt per average revenues in NUTS2-NE regions by category

| Region | Category | Volume of c_1* in % | | | | p |
		Mean	Min	Max	StdDev	
KHR	1	3.60	0.00	73.00	12.10	90
LIR	1	1.30	0.00	18.00	3.90	28
PAR	1	2.20	0.00	36.00	7.60	98
KHR	2	6.10	0.00	77.00	15.00	121
LIR	2	1.80	0.00	44.00	7.20	52
PAR	2	5.40	0.00	71.00	13.70	118
KHR	3	10.00	0.00	60.00	16.60	66
LIR	3	6.00	0.00	40.00	10.60	28
PAR	3	13.40	0.00	83.00	21.90	53
KHR	4	12.00	0.00	58.00	17.60	50
LIR	4	9.10	0.00	53.00	15.70	44
PAR	4	11.50	0.00	71.00	19.40	62
KHR	5	7.20	0.00	30.00	8.70	31
LIR	5	10.00	0.00	71.00	18.70	25
PAR	5	15.50	0.00	64.00	19.20	34
KHR	6	20.10	0.00	64.00	17.00	33
LIR	6	16.80	0.00	55.00	14.10	25
PAR	6	19.90	0.00	49.00	15.20	24
KHR	7	24.00	7.00	40.00	14.00	7
LIR	7	21.00	4.00	32.00	11.90	4
PAR	7	24.30	5.00	40.00	10.80	8

Source: Authors

The histogram in Fig. 2 shows the number of municipalities in individual regions and individual size categories for which the value of c_1* indicator exceed 60%. The results correspond with the results presented in Tab. 3. In Fig. 2 only six size categories of municipalities are shown, because the category 7 has value zero (i.e. no municipality exceeds the 60% indicator level). For example in KHR region, this value is exceeded by two municipalities in first two size categories and by one municipality in categories 3 and 6. But in PAR region, 11 municipalities in total exceed the value (except of the smallest municipalities and municipalities with population between 2000 and 9999 inhabitants). The best result according to this criterion

is achieved by municipalities from LIR region, where the index value is exceeded only in size category 5.

The results form Tab. 3 can be linked to the values from Tab. 4. We have defined the vector of the indicators "risky indebtedness" c. We have used the two already above defined indicators monitored by the MFCR a_4 (share of debt in total revenues) and a_6 (share of debt in total assets) and from them we calculate the indicators c and new indicator c_1^*. The elements of c = { c_1, c_1^*, c_2, c_3, c_4 }, where c_1 is the number of municipalities in a region over the 60% limit from a_4, c_1^* is the number of municipalities in a region over the 60% limit from share of the debt on the average municipality revenues in last four years, c_2 is the number of municipalities below the 60% limit from a_4, c_3 is the number of municipalities that are over the 25% limit from a_6, c_4 is the number of municipalities in a region that are below the 25% from a_6. The values of the indicators are presented in Tab. 4.

Figure 2. Number of municipalities in size categories by the attribute c_1^*
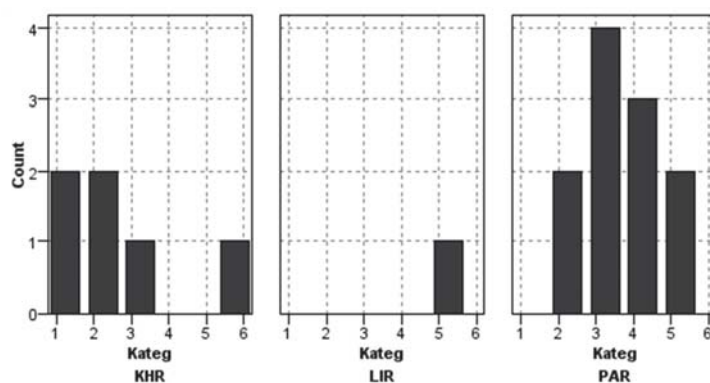
Source: Authors

Table 4. Number of municipalities in the region for the attributes c1 and c1*

Region	Attributes		p
	c_1	c_1^*	
KHR	7	6	398
LIR	2	1	206
PAR	6	11	397
NUTS2-NE	15	18	1001

Source: Authors

When we considered only the simplified c_1 indicator, the critical value of indebtedness exceeded 15 municipalities. Within the c_1^* indicator, 18 municipalities would fail the criterion proposed in the code of budgetary responsibility. The most of these municipalities are from PAR region, only one is from LIR region. 15 of municipalities have less than 1 000 inhabitants.

4 Conclusion

The analysis of the indebtedness data from the regional model shows that the basic characteristics of indebtedness that apply to all municipalities in CR are similar for the NUTS2-NE municipalities. The municipality size structure in KHR and PAR is identical with municipality size in the entire CR with only the exception of the LIR. For all three regions it is valid that the lowest share of municipalities with debt is in the size category 1 and 2 and on the contrary the

largest share of municipalities with debt is in the category 7. The mean values confirm the assumption, that the larger the size of the municipality, the higher the volume of debt per inhabitant. Mean value shows indebtedness per inhabitant. The mean value of debt per inhabitant is lower in 3 regions than in the whole CR.

While evaluating the unhealthy indebtedness with the c_3 indicator of debt share on assets, no NUTS2-SE municipalities exceeded the recommended 25% value. When the simplified indicator of the share of debt on total income in 2013 was used (c_1), 15 NUTS2-NE municipalities exceeded the 60% value. Within the MFCR suggested indicator, that calculates the share of debt on the average total revenues from last four years, 18 NUTS2-SE municipalities exceeded its value in the regional model. The average debt per inhabitant in municipalities which exceeded this criterion is approximately 9 000 CZK. Contrary to the entire sample of NUTS2-NE region were the average debt per inhabitant is 3 400 CZK.

However, it is imperative to bear in mind that we have worked without the outlier values within the suggested regional model. If the outlier values were included, the number of municipalities exceeding the indicator would be higher. Mostly in small municipalities whose revenues fluctuate more than in larger municipalities.

The suitability of using these indicators for the evaluation of critical indebtedness for self-governing entities is questionable – the concrete situation depends on a number of additional factors that depend on the individual municipality financial management [13, 17]. Other indicators need to be taken into account for rating/evaluating the indebtedness of a specific municipality: size of funds on municipalities accounts, purpose of loan (if the project generates income or not, or if it burdens the municipality by other expenditures for maintenance, etc.).

Therefore we need to utilize more indicators and carry out a qualitative assessment to determine if the debt is high-risk for the municipality or not. The municipality indebtedness evaluation is then just an indication for another in-depth analysis of the financial management of a particular municipality.

Acknowledgements

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Who Has Had the Main Say in the Path of the Czech Pension Reform: Politicians, Experts - or Both?

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Abstract

Although pension systems are among the most stable elements of social systems, even they evolve. In recent decades, dozens of countries have joined in by enacting minor adjustments or significant reforms. Politicians as well as invited experts have been paying close attention to the topic. In this paper, we analyze the framework of the spirit and content of the discourse of the Czech pension reform between 2004 and 2014 with the aid of discursive institutionalism theory and methods of framing analysis. The center of our focus is on the institutional framework and the content of the communication of its key actors - politicians and experts. It turns out that even though the politicians cannot make do without the experts while providing them the opportunity to exercise their professional duties and knowledge in the decision-making process, the politicians, themselves, ultimately have the final word.

1   Introduction

After 1989, the Czech Republic went through a transition from a centrally planned to a market economy and from an authoritarian political regime to democracy. It gradually integrated into the structures of the European and global economy, and with this it underwent turmoil as well as the financial crisis at the end of the first decade of the third millennium. For politicians, it was clear that the pension system must be reformed in relation to both the current and especially future challenges. In order to address the identified problems, they began collaborating with experts. How did this collaboration take place? What institutional form did it take? How did the forthcoming proposals reflect the ideological schemes of politicians on the one hand and scientific evidence on the other? What were the ideas of experts, which were ultimately reflected in the laws and administrative practice, which were not - and why?

2   Material and Methods

The subject of our investigation is the nature and content of the discourse regarding the Czech pension reform, its trends and institutional configurations between the years 2004 and 2014. The focus of our attention will be the analysis of this discourse by the key actors - politicians and experts.

As we do not deal with the evolution of the pension system as such, we do not intend to describe its changes in detail. In the text, we do refer mostly to political conceptions associated with the changes in its three pillars. Refer to the following table.

Table 1. Terminology of Pillars in the Czech Pension System

First pillar	Public, defined benefit, PAYG pillar
Second pillar	Voluntary private, defined-contribution, fully-funded pillar
Third pillar	Voluntary pension insurance with a state contribution (since 1994),
	voluntary savings with state contribution (since 2013)

Source: Authors

Based on the preliminary study of the subject we have developed four hypotheses:
  A. In conceiving pension reform policy, it is necessary for the participation of experts as well as for their participation in proposing specific institutions;
  B. The discourse about pension reform blended together ideological and cognitive frameworks;
  C. The final word on the form of reform of changes which politicians have;
  D. The broader ideological spectrum of the stakeholders, the more robust the proposed solution is.

To analyze the process of discussions for the preparation and the implementation of the individual steps of the Czech pension reform, we decided to choose the most suitable theory of discursive institutionalism in combination with the method of framework analysis.

2.1 The Theory of Discursive Institutionalism

The Discursive Institutionalism theory explains the role of ideas and debates in politics. It distinguishes between cognitive and normative ideas. Cognitive ideas describe and try to identify "how what works and what does not work" and "how and what can be accomplished." In the case of pension reforms it has proved to be useful to identify the fiscal imbalance in the system as the major problem, then threatens the living standards of the elderly as a social problem and then "finds" appropriate solutions to this situation. In contrast, normative ideas justify changes with reference to their suitability in the normative sense - "what is good, what is bad, what should be done" [3] [15].

Although discursive institutionalism has brought new possibilities to explain the institutional changes, it still needs to perceive the risks that are associated with its application. We must always take into account the fact that the traditions and culture will always influence the presentation of ideas and lead the discussion [15].

For empirical research it is a challenge to identify when, where and why the ideas and discourse brought about institutional change and when it does not. We opted for discursive institutionalism theory as, in comparison with other theories of institutionalism, it offers a more dynamic approach to the analysis of institutional change.

2.2 Method of Framework Analysis

One tool that allows one to understand how discourses are constructed and made up, it is called "framing" [12] [16]. A framework can be seen as "interpretive schemes" which show us how to identify, feel and brand events and circumstances, which accompany them [6] [13]. Framing can be termed a process in which the highlighting and naming of a (chosen) aspect of the problem occurs, by which then attention (selective attention) increases. Logically, followed by disregard or lack of perception of the attributes, which were not included during the „framing of the problem" into the spotlight - an imaginary picture frame of sociopolitical reality. The actors (some knowingly, some unknowingly) "overlooked" other aspects of the problem [8].

With good "framing" of the problem, we can, to some extent, predefine its social meaning, its essence and ultimately possible strategies to solve it [12]. It is assumed that it comprises:
  1. naming the subject area;
  2. identifying the competitors within the framework;
  3. identifying the framework sponsors, such as civil servants or special interest groups, including their institutional positions and interests;
  4. marking the forum in which the competition takes place between them [8] [14].

Thus applied, the analysis of the frameworks becomes an appropriate tool regarding the application of the theory of discursive institutionalism in the empirical analysis of this topic.

Discourse is connected with the processes of conversation and communication. Framing makes an impact from the viewpoint of the communication and the type of discourse, namely two types of interactions - articulation and the presentation of the chosen framework [2].

3 Results and Discussion

In the history of pension debates in the Czech Republic between 2004 and 2014 we can find a few, more or less formalized attempts to establish an institutionally established discourse. In this study, we will work with five such attempts, which we will try to analyze in terms of the type of discourse used to map out ideas (both normative and cognitive) and evaluate them in terms of the potential to initiate institutional change.

Table 2. Institutions of discourse regarding Czech pension reforms

Characteristic institute	Time Period	Political representation (normative ideas)	Expert representation (cognitive ideas)	Acceptance of proposals by political representatives
Executive team and Team of experts (Bezděk Commission I)	2004	All political parties represented in the Chamber of Deputies	Yes - economics and Demography	No
Expert Advisory Board - PES (Bezděk Commission II)	2010	No	Yes, mainly economics	No
The National Economic Council - NERV	2011-2012	No	Yes – economics	Partly
Expert Group: government and opposition party (ČSSD)	2011-2012	Representatives of the ruling coalition and the strongest opposition party	Yes – economics and sociology	Partly
Expert Committee on Pension Reform (OK)	2014+	All political parties represented in the Chamber of Deputies	Yes – sociology, Demography, economics	Partly

Source: Authors

3.1 Executive Team and Team of Experts (Nicknamed Bezděk Commission I)

In 2004 there was an attempt to create an institutional platform for the professional assessment of pension reform in the country. Vladimír Špidla, the then prime minister and the chairman of the leading coalition party – the Czech Social Democratic Party (ČSSD), suggested the creation of a commission that participated in the assessment of pension reform options put forward by political party experts in order to broaden the range of actors involved in the issue of pension reform.

The framing of the issue of pension reform in the actions of the Bezděk Commission I reflected on the "climate" of discussions on pension reforms in the international context. The World Bank "reframed" the issue of security in old age in 1994, when it released the publication "Averting the Old Age Crisis: Policies to protect the Old and the Promote Growth." [17]. This meant reframing the target discourse on the "financial unsustainability" of public pension systems. The First Bezděk commission widely accepted that framework.

The diagnostic framing or the defining of "What's the problem?" can be found as issue no. 1, which the executive team working group asked: How will it ensure long-term financial sustainability of the mandatory pension system? The definition of the problem to some extent affects the range of possible solutions.

3.2 Expert Advisory Board PES (Nicknamed Bezděk Commission II)

During the caretaker government of Jan Fischer, the Finance Minister (Eduard Janota) and the Minister of Labour and Social Affairs (Petr Šimerka) in January 2010 established the Expert Advisory Board (PES). The management of this team was again assigned to Vladimir Bezděk. It

was composed mainly of professionals from the financial sector, representatives of state administration and a representative of the Czech-Moravian Confederation of Trade Unions.

The framing of the issues of PES was influenced by the fact that they had more or less "just" established and updated the activity of the first Bezděk Commission.

It is possible to find "mobilization vocabulary " in the final report aimed at the primarily political representation. It was also interesting and very prescient that the refusal of voluntary opt-outs was not evaluated due to the expected low interest of citizens [9].

3.3 The National Economic Council – NERV

The Petr Nečas government, formed after early elections (2010) restored NERV, the economic advisory body. New members, among others, were Eduard Janota, Minister of Finance in the previous period and Vladimir Bezděk (Chairman PES).

Amongst other areas, the experts of NERV were logically involved in the preparation of key government reforms, not excluding pensions. NERV followed the work of the previous professional groups, especially the first Bezděk Commission and subsequently PES. The old-new government advisory body the National Economic Council formulated recommendations for the pension system, relying, among other things, on conclusions reached by PES. The proposed solution was again based on an argumentative strategy based thesis about the financial unsustainability of the Czech pension system and to promote the strengthening of the merit system, supported by the introduction of the second pillar to the Czech pension system.

Framing the issue was consistent with the approach of PES. NERV openly declared that it was building on the work of PES, and used its recommendations as a starting point. Within the diagnosis of the causes was equally central thesis of the financial unsustainability of the system was a central theme within the diagnosis of the causes. The proposed solution envisaged the introduction of the second pillar to the Czech pension system on a compulsory basis [10].

The mobilization vocabulary was directed primarily to the executive. The urgency of the problem as well as the concept of pension reform were also presented to the public in order to stimulate debate about this problem. Communications were eventually negatively influenced by opinion over differences of opinion among members of NERV and the government coalition.

The concept of paradigmatic pension reform was finally adopted by the government of Petr Nečas. But the adopted reform was created as a compromise solution within the unstable ruling coalition and contained a wide range of concessions and deviations from NERV's proposed concept. The reception of the proposal was negative not only from the opposition but also among professional circles. The recommendations for pension reform by NERV, were, in many aspects, ignored by the government, which triggered the need for NERV to present the differences from the original idea, among other things, in the media [7]. The presentation of pension reform to the public (communication discourse) was also weakened by low support inside and outside the coalition. The opposition as well as social partners were able to lead the communication discourse in a way that affected the public's attitude to the proposed draft pension reform. This attitude could be reflected in a lower willingness of citizens to join the newly created second pillar of the pension system.

3.4 Expert Group: Government and Opposition Party (ČSSD)

On 13. 7. 2011 a meeting was held between the then Prime Minister Petr Nečas (ODS) and the head of the strongest opposition party ČSSD Bohuslav Sobotka. The politicians had agreed to establish an expert group (ES), which was supposed to deal with the proposed changes to the pension system in the defined areas.

The work territory of this group was framed by the then Prime Minister and the opposition leader by very specific framing issues. The framing of its problem issues even brought about the elimination of a controversial topic (Government preparation of the Second pillar, that is to say paradigmatic pension reform), as views of the government and the Social Democrats regarding this part of the pension reform were diametrically divergent.

The main outcome of the ES was the proposal of specific "early-retirements" that would allow policyholders who participated in the pension insurance with a state contribution (the so called third pillar of the Czech pension system) to retire before reaching retirement age by using the accumulated funds in the overarching period. In less than a year the Expert Group came to the design phase of the solution, which, after having been discussed in other organs (tripartite meeting of economic ministers), was green-lighted for preparation, followed by the adoption of the relevant Act No. 403/2012 Coll. (in force since 1. 1. 2013).

The language of the group was professional and due to the nature of the work of the group was targeted for the politicians of the governing coalition. The urgency of the problems was not articulated to the public.

3.5 Expert Committee on Pension Reform

The Expert Committee on Pension Reform (OK) was formed after the elections in 2013 on the basis of the coalition agreement and the policy statement of the new center-left government of the Czech Republic. The Committee consists of permanent members, which include representatives of all political parties represented in the Chamber of Deputies, experts nominated by these parties and representatives of the social partners. As associate members of the commission, the OK has representatives of associations and professional organizations. The main political requirement for the operation of OK was the basis for finding a broad consensus about the continuation of pension reform. Key parameters, which are in the draft pension reform, are as follows: the ability of the system to ensure a decent life for pensioners, strengthening the principle of merit, settlement transfers between family and society and the sustainability of the pension system. [11]. One of the goals was also to find a suitable way of eliminating the pension savings (i.e. the 2nd Pillar of the Czech pension system).

The change of the "framework" also resulted in changes in the spectrum of resolved areas and proposed solutions. New attention was focused on among other things such as transfers between citizens, families and the state pension system or through strengthening the motivation of people to create long-term savings for retirement through the so-called third pillar pension system. Part of the discourse remained with traditional topics, such as the indexation of pensions and the issue of setting the retirement age. Due to the wider "framework" of resolved problems, new alternative solutions surfaced to "standard" questions. Changing the framing can be illustrated by the example of the transformation of previously asked questions such as: "*Raise the retirement age - yes / no, how much?*" which provoked sharp disagreements, into the question: "*How can we successfully set the retirement age which takes into account changes in life expectancy and the aim to ensure a decent life for pensioners?*"

Characteristic institution	Time Period	Cognitive ideas	Normative ideas	Acceptance of proposals by political representatives
Executive team and Team of experts (Bezděk Commission I)	2004	Macro-economic criteria and their projections, demographic criteria, and their projections, assuming the pension orthodoxy of the World Bank from 1994	Differentiated proposals of political parties on pension reform	No
Expert Advisory Board - PES (Bezděk Commission II)	2010	ditto	Strengthening the level of the merit system, financial stability of the public pension system	No
The National Economic Council - NERV	2011-2012	ditto	ditto	Partly
Expert Group: government and opposition party (ČSSD)	2011-2012	Comparison of pension systems from different countries	Not expressed explicitly	Partly
Expert Committee on Pension Reform (OK)	2014+	A significant expansion of the analytical basis of work, inviting sociologists, demographers and economists	Explicitly expressed by four criteria: ensuring a decent life for pensioners, strengthening the principle of merit, settlement transfers between family and society, the sustainability of the pension system	Partly

Source: Authors

4 Conclusion

We have prepared the grounds for the final testing of the hypotheses formulated in the introduction by a detailed analysis of discourses in question.

A. In conceiving pension reform policy, it is necessary for the participation of experts as well as for their participation in proposing specific institutions.

Pension policy has traditionally been an area that required a greater extent of expertise than some other areas. Traditional partners (government, employer and worker representatives) had possessed almost a monopoly in this arena for a long time, including exclusive access to relevant information and data, in most cases, which was available only to governmental entities (statistics, demographic data, data on pension schemes etc.). Although there have been many radical changes needed, the professional approach (data, methodology for design development etc.) has not changed much. Responsible, data-based decision making requires the use of a range of expertise and methodologies, including the use of a wide data base. It can be assumed that the role of experts in this policy area will continue to grow. We can therefore confirm the hypothesis.

B. The discourse about pension reform blended together ideological and cognitive frameworks.

This hypothesis is clearly confirmed in this paper. Primarily, it corroborates that, views of the almost crystalline reform strategies, which lay on the left-right political spectrum. Secondarily, that blending symbolizes the participation of experts (sometimes ideological classifications) and politicians in discussions on the preferred form of pension reform. Knowledge frameworks in some cases are used for the benefits those who hold ideological values. This is true but on the contrary: the ideological framework may, ceteris paribus, lead to the selection of some and rejection of other pieces of knowledge.

C. The final word on the form of reform of changes which politicians have.

This hypothesis in our study confirms not only the refusal of the first recommendation of the Executive team and a Team of Experts in 2004, but also the case of NERV later on. The political reality did not allow the majority to accept the concept of the proposed experts from NERV, and therefore political representation adopted the revised draft. This political compromise proved to be unacceptable to the experts, further affecting the communicative discourse of reform. Expert advice is marked by the process of finding political continuity and consensus. Nevertheless, even as politicians have the final say, their decisions may to a lesser or greater extent refer to the opinions of the experts as well.

D. The broader ideological spectrum of the stakeholders, the more robust the proposed solution is.

The connection of the concepts of pension reforms with the ideological bases of the political parties intensifies the rivalries of the actors and complicates the search for a compromise. Finding a solution that has support across the political spectrum is very tricky in the case of pension schemes which is calculated on the effects of decades of change. Profile cases have shown that solutions (albeit particular ones), which were accepted as part of the discourse in which they were represented, by actors from across the ideological spectrum are more stable (e.g. the work of the Expert Group on early-retirements proposal) than solutions that lack such support (paradigmatic reform including the Second Pillar). Due to the nature of pension reform (long-term) and the relatively short period in which the discourses are analyzed, we can only partially confirm the hypothesis.

It is obvious that the period analyzed, though eventful, was not long enough, that we dare to generalize beyond the development discourse of the pension system in one country at a given time. We believe, however, that our approach can inspire in exercising discursive institutionalism theory and framework analysis, so that the role of experts and policy makers in the design and implementation of changes in social systems can be better understood. In this respect, it will be interesting to study, among others, the results and outputs of the work of the Expert Commission on Pension Reform established in 2014 [5].

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Provisional Budgets and Budget Accuracy in Czech Towns

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Abstract

The purpose of the paper is to explore the frequency of the provisional budgets and the influence of the time of budget approval on budget accuracy in Czech towns with more than ten thousand inhabitants between 2010 and 2014. The difference of means test (t-test) is used for the analysis. Provisional budgets are quite common in Czech towns, on average 28% towns used provisional budget between 2010 and 2015. Its usage is higher in the postelection years, especially 2011. The time of budget approval does not influence the accuracy of any type of budget revenues, however it has, with exception of 2012, positive impact of the accuracy of current expenditure. Its accuracy is higher in towns which approved their budgets later, i.e. in the course of the current fiscal year.

Keywords: budget accuracy; provisional budget; local government; rebudgeting

JEL Classification: H61, H72

1 Introduction

It is assumed that municipal budget is approved before the beginning of the fiscal year and that its execution closely follows the approved budget. In reality we often observe two divergences from this process: First the budget is approved after the fiscal year starts and municipal budget management in the first weeks or months of the new fiscal year follows so-called provisional budget. Second the approved budget is frequently amended during the fiscal year and both the revised and executed budget differs significantly from the approved one.

Budget is a plan for financing a government during one year, which is prepared and submitted by a responsible executive to a representative body whose approval is necessary before the plan may be executed [2]. If the budget is not approved on time, i.e., before the fiscal year starts, municipal council has to approve rules of provisional budget. The law on budgetary rules for local governments (250/2000 Coll.) does not specify these rules. Recommendation of the Capital city Prague to its districts [5] can serve as an example which illustrates how these rules can be designed:

- The districts´ monthly expenditure needn´t to exceed 1/12 of the approved budget for the previous fiscal year,
- The district adjusts its real expenditure to real revenue in the period of a provisional budget,
- The district has to fulfil on time all its legal and contractual obligations,
- The district should not make new contracts, if there is no certainty, that it has sufficient financial means and
- Revenue and expenditure realized during the period of the provisional budget become revenues and expenditure of the budget after its approval.

The approved budget should reflect the most efficient allocation of the disposable resources as it was carefully prepared and debated [4]. However some budget inaccuracy is inevitable. In case of revenue overestimation not all approved expenditures can take place and cuts are needed. Revenue overestimation softens the hard budget constrain and shifts the decision-making about the needed cuts from the preparation and approval phase of the budgetary process to the execution phase Rubin [6]. Underestimation means that during the budget year there appear some additional revenues. These revenues are either conditional

grants, i.e. they can be spent only for a given purpose, or taxes and other unconditional revenues which can be either added to the year-end balance or spent on newly approved expenditures.

The approved budget is therefore often modified in order to manage unforeseen events during the course of the fiscal year. Revision and update of the adopted budget is called rebudgeting [3]. While both budgeting (i.e., decision-making before budget approval) and rebudgeting (decision-making after budget approval) set specific resource allocation, there are significant differences among them. Budget preparation (i.e., budgeting) is a standardized process, often regulated by internal regulation such as budget calendar or budget guidelines, with clearly defined actors, roles and time line. Rebudgeting is less transparent than budgeting [1] as it is composed of several (many) small amendments which is difficult to monitor and control both for the council members and the public.

The paper follows on our previous research on budget accuracy, tax revenue forecasting error determinants and rebudgeting. In [7] we showed that tax forecasting errors are influenced by the economic situation and structure of tax revenue and that impact of political factors is quite strong: municipalities with more fragmented municipal councils approve more optimistic tax revenue forecasts and forecasts are more optimistic in election years. In [8] we concluded that most of the revenues are included in the revised budget as soon as they materialize and the volume of the collected revenues is in line with the revised budget. At the same time substantial expenditure changes are approved through the budget amendments but the real spending is very close to what was originally budgeted for all types of expenditure. Small amount of unconditional windfall revenues limits the space for opportunistic allocations.

The major research question of this paper is if the time of budget approval has any influence on budget accuracy and hence the need of rebudgeting?

The purpose of the paper is to explore the frequency of the provisional budgets and the influence of the time of budget approval on budget accuracy in Czech towns with more than ten thousand inhabitants between 2010 and 2014. The paper is organized as follows: first the data and methods are described and then the results are presented and discussed.

2   Material and Methods

The research focuses on towns with more than ten thousands inhabitants as of 31 December 2014. There are in total 131 such towns. Eight of the biggest towns (Brno, Liberec, Opava, Ostrava, Pardubice, Plzeň, Praha and Ústí nad Labem) are divided into districts with their own budgets. The data on individual districts' budgets are not available and therefore they are not included in all of the analyses.

The data on the date of budget approval were collected from town council resolutions available on the web pages of the individual towns. The older resolutions were not always available so the sample in the individual years varies between 115 and 131 towns (in case of analysis of budgetary data 107 and 123 towns).

We use budget data provided by the Ministry of Finance through its database Monitor. It provides detailed data for all municipalities in 2010-2014 classified according to the detailed budget classification. For each line item, three values are available: the value approved in the budget (B), the value revised through the budget amendments in the course of the budget year (R) and real execution or collection (E).

There are evaluated two dimensions of budget accuracy: the extent of budget changes during the year, i.e., the change between the revised and approved budget (R/B) and accuracy of the approved budget, i.e., the change between the real execution or collection and the approved budget (E/B).

The analysis deals with major types of revenues and expenditure: tax revenues, non-tax revenues, capital revenues, current transfers, capital transfers, current expenditure and capital expenditure. With exception of current and capital transfers the classification follows the major categories (classes) of the economic classification. In case of current and capital transfers the first level of sub-classification is used.

The difference of means test (t-test) is used to indicate significant differences between towns which approved the budget by the end of December or after January 1 of the particular fiscal year.

3 Results and Discussion

The usage of a provisional budget is quite common. On average it was used by 28.7% of the analysed towns between 2010 and 2015. The share is higher in the post-election years 2011 and 2015 (Table 1). This is not surprising as the elections take place in middle October. There needs to be first elected the mayor and town commission and only then the preparation of budget proposal can be finalized. In case of change in the composition of the town commission the completion of the draft budget requires more time and leads to later approval.

Table 1. Date of budget approval and use of a provisional budget

	2010	2011	2012	2013	2014	2015
September t-1		1				1
October t-1	1	1				
November t-1	1		4	3	4	
December t-1	82	71	90	95	97	90
January t	11	12	9	8	9	10
February t	12	25	16	15	13	18
March t	7	12	8	6	7	11
April	1	1	1	1	1	1
May		1				
June				1		
Share of towns with provisional budget	27.0%	41.1%	26.6%	24.0%	22.9%	30.5%

Source: Author

Majority of towns (53%) manages always to approve the budget by the end of December. On the other hand in 21 towns (16%) the usage of the provisional budget is a standard part of the budgetary process. The distribution of frequency of provisional budget usage is quite similar across both analysed size groups (Figure 1), however the average usage differs significantly (at 90% confidence level). Towns with less than 20 thousands inhabitants used the provisional budget in the analysed six years in 1.99 cases and bigger towns in 1.24 cases.

Figure 1. Frequency of provisional budgets (2010-2015)
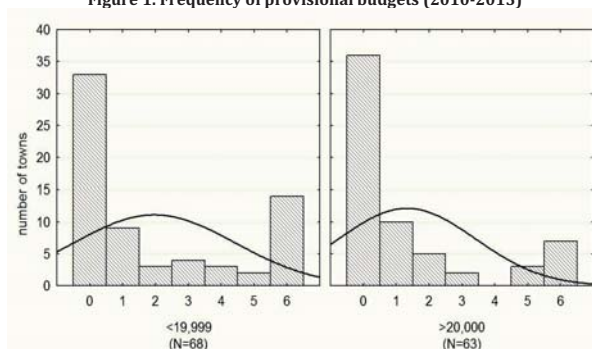
Source: Author

The analysis of the differences in budget accuracy between towns with (P=1) and without (P=0) provisional budgets shows that with a few exception the time of budget approval does not matter. In case of budget revenues the differences are quite random.

Table 2 and 3 show the average values of revised/approved revenue and expenditure (R/B) and executed/approved revenue and expenditure in the two groups of town. The values N0 and N1 show the number of towns in each group. If the budgeted amount was zero than the town is not included in the analysis and N=N0+N1 is lower.

Table 2. Differences between approved, revised and executed revenue

	Revised/approved budget (R/B)				Executed/approved budget (E/B)						
	P=0	P=1	st0	st1	P=0	P=1	st0	st1	N0	N1	N
Tax revenues											
2010	1.035	1.031	0.063	0.064	1.042	1.039	0.078	0.081	78	31	109
2011	1.010	1.010	0.059	0.038	1.002	0.993	0.077	0.047	68	49	117
2012	1.035	1.037	0.053	0.051	1.055	1.061	0.066	0.063	87	33	120
2013	1.041	1.040	0.054	0.050	1.108	1.089	0.072	0.061	91	30	121
2014	1.055	1.032 *	0.060	0.041	1.124	1.090 **	0.068	0.049	93	30	123
Non-tax revenues											
2010	1.427	1.446	0.700	0.625	1.416	1.413	0.766	0.709	78	31	109
2011	1.495	1.369	0.705	0.954	1.485	1.368	0.695	1.023	68	49	117
2012	1.340	1.215	0.716	0.304	1.365	1.210	0.751	0.325	87	33	120
2013	1.426	1.248	0.716	0.419	1.399	1.288	0.776	0.527	91	30	121
2014	1.373	1.197 *	0.531	0.233	1.365	1.253	0.531	0.334	93	30	123
Capital revenues											
2010	3.283	2.472	10.104	3.242	2.231	2.681	3.362	3.640	50	24	74
2011	2.262	7.469	3.773	21.342	2.253	7.635	3.667	21.402	42	28	70
2012	2.335	10.710	5.152	37.441	2.286	10.671	5.141	37.455	54	18	72
2013	12.206	6.151	48.025	13.356	12.737	7.643	48.218	13.274	62	16	78
2014	2.862	6.472 *	5.166	12.913	3.354	6.135	6.631	12.680	57	19	76
Current transfers											
2010	11.392	1.586	35.361	1.062	11.326	1.585	35.194	1.063	78	31	109
2011	10.941	1.631 *	33.670	1.204	10.944	1.617 *	33.724	1.197	67	49	116
2012	3.636	1.271	13.043	0.234	3.623	1.256	13.094	0.246	86	33	119
2013	2.714	1.319	9.394	0.237	2.692	1.287	9.404	0.280	90	30	120
2014	39.316	1.549	295.801	0.614	42.156	1.521	322.779	0.674	91	30	121
Capital transfers											
2010	1.501	1.214	1.074	0.559	1.280	1.062	1.032	0.748	36	17	53
2011	2.111	6.373	2.695	15.574	1.852	6.410	2.805	16.453	33	28	61
2012	1.973	2.596	3.145	7.094	1.763	1.395	3.122	2.152	36	22	58
2013	6.664	13.251	26.433	35.155	6.287	10.753	26.395	29.662	41	19	60
2014	21.748	1.533	73.519	1.194	21.658	1.421	73.545	1.232	40	16	56

Source: Author

The results of this first analysis are quite surprising and cast doubts about some common assumptions about municipal budgeting. Clearly the impact of the overlapping budget cycles of different governmental levels is not very strong. It is assumed that municipalities which approve the budget in December do not yet have information about the transfers approved in the state or regional budget and therefore do not include these transfers into their approved budgets. The

figures shown in Table 2 contradict this assumption and show that municipalities do include into the budget some estimates which are much later adjusted, if necessary, and that there are many other current transfers that are determined later during the fiscal year.

On the other hand, capital revenues and capital grants are often not included in the approved budget at all. 37% of municipalities did not include any capital revenues and 51% of municipalities did not include any capital grants into the approved budget. Capital grants are, however, more often included in the budget in towns which use the provisional budget: While, on average, 55% of towns which approve the budget by the end of December do not include any capital transfers into their approved budget, in case of towns with a provisional budget it is only 41% of towns (see the low numbers of N0 and N1 in case of capital transfers comparing to other types of revenues in Table 2).

In case of current expenditure we can observe, with the exception of 2012, systematic difference in budget accuracy between the two groups regardless the indicator used. The exceptionality of the year 2012 suggest that the conclusions of [8] should be verified using data for more years than only 2012.

Table 3. Differences between approved, revised and executed expenditure

	Revised/approved budget (R/B)					Executed/approved budget (E/B)							
	P=0	P=1		st0	st1	P=0	P=1		st0	st1	N0	N1	N
Current expenditures													
2010	1.258	1.148	**	0.247	0.217	1.180	1.096	*	0.242	0.227	78	31	109
2011	1.240	1.146	**	0.226	0.217	1.165	1.078	**	0.216	0.207	68	49	117
2012	1.089	1.065		0.118	0.105	0.999	0.996		0.105	0.088	87	33	120
2013	1.122	1.061	***	0.104	0.090	1.022	0.982	**	0.087	0.075	91	30	121
2014	1.140	1.061	***	0.090	0.092	1.037	0.971	***	0.071	0.092	93	30	123
Capital expenditures													
2010	5.490	2.966		21.494	4.693	5.235	2.551		21.527	4.084	70	27	97
2011	3.708	8.325		7.160	38.417	3.635	8.210		7.577	38.447	65	47	112
2012	3.101	2.152		7.555	2.545	2.781	1.929		7.477	2.552	79	28	107
2013	2.812	2.828		4.363	4.994	2.511	2.760		4.286	4.985	87	29	116
2014	14.708	2.982		74.941	2.783	13.833	2.629		74.343	2.851	86	29	115

Source: Author

4 Conclusion

Provisional budgets are quite common in Czech towns, on average 28% towns used provisional budget between 2010 and 2015. Its usage is higher in the postelection years, especially 2011. The time of budget approval does not influence the accuracy of any type of budget revenue, however it has, with exception of 2012, positive impact of the accuracy of current expenditure. Current expenditure accuracy is higher in towns which approved their budgets later, i.e. in the course of the current fiscal year.

The differences in the accuracy of the current expenditure in towns with and without provisional budget are interesting and need to be explored further. It would be interesting to research the relationship between current grants and current expenditure and to scrutinize individual functional areas of current expenditure. It raises also some questions regarding rebudgeting. If the budgets approved later are more accurate, does it mean that less rebudgeting takes place and that the changes in the individual types of expenditures and the expenditure structure are smaller?

Acknowledgements

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Policy Case Study:
Impact of the Policy Changes on the Housing Loan Market

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Abstract

The article analyses the impact of the state regulation on a housing loan market in Slovakia in the period of 2010 till 2015. This issue is explored by the case study that enables a holistic view of the influence of three factors (policies) in one area and comparing the situation prior to and after the policy changes. The research showed that increase in competition in the market for refinancing of housing loans went hand in hand with significant decrease in the interest rate charged beyond what can be explained by other market factors. From policy perspective it indicates the need for evaluation of the policy impact and for the continuing policy changes to reach required impact in the field of multiple actors and multiple factors.

1   Introduction

A property buyer could potentially save thousands of Euros on their mortgage or housing loan with growing competition among the lenders. As was implied, the competition in the mortgage and housing loan market plays a crucial role in ensuring better conditions for consumers such as wider range of products, lower interest rates, lower monthly payments, more favorable refinancing options, better customer service, new innovations (e.g. managing mortgages and housing loans via internet) and many others [1]. The impact of government regulation on the mortgage and housing loan market competition is tremendous. Firstly, it can make the market more open for the new players, secondly, better lending conditions can be obliged by regulation and finally, obligation of providing substantially more information to the clients can be introduced. However, in practice we can often notice the combination of the possible listed interventions. Sometimes regulations are necessary in order to avoid "predatory lending", however, when very high regulation is imposed on lenders, they may pass their additional costs to customers [2].

There are three main actors in the housing loan market in Slovakia: clients (debtors), banks that provide loans, and the state in the role of a regulator. The state as the regulator of the housing policy can influence the housing loans availability through various policy tools. Since the housing loan market in Slovakia has recently undergone significant policy changes, the aim of this paper is to explore the impact of the three factors (interventions) on the housing market in Slovakia in the period since 2010 till 2015. This paper will therefore present the policies the Slovak government adopted to achieve higher competition in the mortgage and housing loan. At the end of the paper an estimation of the impact of these changes is provided.

This type of research is relatively rare, but Campbell deals with impact of early repayment modalities and their impact in the US and Danish mortgage markets [3]. Bennett, Peach and Peristiani examine how structural changes in the market impact tendency to refinance [4]. Nevena and Röllerc look at the broader impact of increasing competition on consumer market in Europe including the mortgage market [5].

2   Material and Methods

The aim of the paper is to explore the impact of the three factors on the housing market in Slovakia in the period since 2010 till 2015. The housing loan market is influenced by many factors and therefore there are two possible approaches to explore the impact of the regulations on this market. The first one is to conduct experimental research. This approach requires data that are however, in this case not openly available and many of them are not accessible due to the bank secrecy rules. Therefore this approach is relatively costly and is rarely applied in the given area. The second approach, which has its limits, is to develop a case study based on the publicly available data related to the interest rates development and re-financing. Its limits lie in the fact that it does not allows to specifically define the influence of the concrete factors and is more descriptive.

The paper is therefore a case study as defined by Gerring - 'an intensive study of a single unit with an aim to generalize across a larger set of units' [6]. Single country design was chosen to allow a holistic view of the influence of three factors in one area and comparing the situation prior to and after the policy changes. As noted by Yin, case studies are appropriate instruments for social science research when the phenomenon being studied is highly complex and 'when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon with some real-life context' [7]. In such a context, Gerring and Van Evera emphasize the complementarity of single-unit and cross-unit research designs rather than superiority of one or another [6], [8] .

3   Results and Discussion

3.1 Main Types of the Housing Loans

There are several types of housing loans on the market [9], namely: the mortgage, the consumer loan and the investment loan, the housing loans (from the Stavebná sporiteľňa), and the interim loan. Firstly, there is a mortgage with the typical repayment time of 30 to 40 years. This type of loan is guaranteed by a property within the borders of the state, which the bank has a pledge over. Other products on the market are so called *other housing loans*, e.g. consumer loan or investment loan for buying a property. The consumer loan is designed to purchase a whole property or to supplementary fund a remaining part of the mortgage. The third type of the housing loans are specific housing loans (provided by Stavebná sporiteľňa). Before being able to apply for a housing loan from a building society, a building society saving account is necessary. Subsequently, the client funds a property purchase partly from the savings accumulated on his saving account at the buildings society and partly from the building society's loan. The last type of a housing loan is an interim loan. It is a specific form of a loan, which serves as a bridge in the meantime one needs to liquidate until they are entitled to the housing loan.

Figure 1. Dynamics of housing loans development
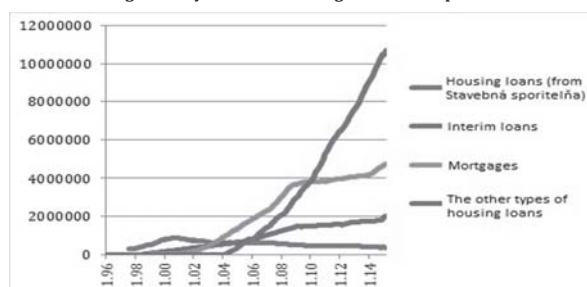
Source: Authors based on National Bank of Slovakia

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3.2 The Three Main Factors of the Housing Loan Market

The conditions under which the loan is provided play a pivotal role in the demand formation. The most important factors in the process are:

- *Interest rate*. They can be *variable*, or *fixed*. The fixation terms are diverse. The bank offers a range of possibilities and the client chooses a variant which is the most convenient to him. The rule is that the longer is the loan scheduled for, the higher the interest rate. This consists in the bank taking on higher risk and its needs to find coverage from the investors for the scheduled period of time. The bank, in fact, acts more like a mediator of the flow of the money rather that the provider of the resource itself.
- *State interest rates subsidy (bonification).* The state bonification is an extra financial support provided to the debtors by the state.
- *Market constestability.* The constestability concises the possibility to repay the loan prematurely and the relating conditions. This determines whether the client has an option to find a more convenient product on the market, a new loan, and refinance the previous loan.

The above mentioned factors have been changing over time with large dependance on the state policy. In 1990s it was possible to get a housing loan, nevertheless, the demand was relatively low. The reason were the high interest rates which stemmed from the Slovak internal situation which influenced its international ratings. Slovakia's financial credibility on the financial markets was low, consequently, the interest rates in Slovakia were high.

A change came with Mikulas Dzurinda in 1998. As a result of introduced reforms, the interest rates dropped. Furthermore, some banks were privatised which in turn meant bringing over the western know-how in leasing. In particular, the emphasis moved to the financial products for households.

In 2000, the state started bonification of housing loans. As the figure below depicts, the bonification level decreased with the time as it was 5% in 2000, then 4,5%, later 2,5% and when the loan market was enlivened, the state bonification went down to 1%. In 2005, the housing loan bonification was completely abandoned.

The successing government of 2006, under Robert Fico, revived the state bonification. This time, however, only for a targeted part of population – the young people and newlyweds, as shown in figure 2.

Figure 2. The number of contracts with the state support entitlement and the number of contracts with the state support entitlement for young people.
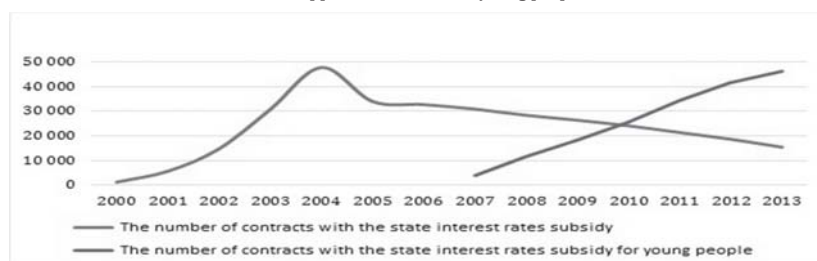
Source: Authors based on the IFP data

Apart from the state bonification, the state's support in the area of house loaning was provided by regulating the contract entering conditions. This was done via the Bank law no. 483/2001. Otherwise, the development of the housing loan market has been rather spontaneous.

A significant change occurred when the Slovak Republic entered the Eurozone in 2009 which took place at the time as the great financial crisis of 2008 hit the country. As a reaction to this, the European Central Bank decreased the interest rate to a level close to zero. Slovakia suddenly found itself in a situation of the common currency, with almost zero interest rate and in a situation where the banks were able to borrow money on the interbank market for less than ever before. This created a pressure on lowering the interest rates for housing loans. The reform of the leasing conditions, described below, even enforced and accelerated the pressure. However, even without any reform the interest rates for the new loans would have dropped given the other mentioned changes on the market. The reform that is discussed below spread the competition even over the loans issued in the previous years. This was possible as it gave more rights to the customer, such as the right to repay the loan prematurely without any additional fees. Moreover, people were allowed repaying their existing less convenient housing loans on the basis of this right and enjoying the benefit of the new lower interest rate.

3.3 Policy Changes towards the Housing Loan Market

The state regulates the housing loan matters primarily through the Bank Law no. 483/2001. The 2010 IFP analysis of the housing loan market [10] emphasizes the necessary role of the state as a regulator particularly in the three key factors from the Section 2. In the following part, we discuss the regulation interventions after 2010 and their impact on the development of these three factors.

Competition – Contestability of the Housing Loan Market

The market of already issued loans had been inflexible. After a mortgage had been provided, the transfer into a different bank was troublesome due to the high penalization fees. This state of affairs had been typical for the market ever since Slovakia's transition into market based economy. The situation had been even worsened by customers' inability to move their already gained state support in the form of bonification into their new bank.

At the same time, the IFP pointed out that few big providers prevailed on the market. For instance, in 2009 the two largest banks were responsible altogether for two thirds of the whole volume of the new loans issued that year.

Another point the IFP made was that the housing loans in Slovakia seemed still more expensive than the ones in the other countries of the Eurozone [10]. The situation became even more problematic as the country entered the Eurozone and the financial crisis broke out; the gap deepened between the conditions under which people could be granted a loan and conditions under which the loans could be refinanced.

The first Bank Law amendment occurred in 2011. The new law allowed people to refinance their existing loans if their interest rate was changed as well as transfer the state bonification over to a new loan provider. The intended goal was to avoid locking up the customer in one bank by losing their state bonification and paying high fees in case they decided to refinance their loan. This was achieved by banishing the interbank loan transfer fees after the fixation period. Consequently, early repayment of the whole loan became simpler and the market became more open to new players.

The law amendment also introduced stronger banks' duties to provide information to the customers. Banks were required to notify the clients about their interest rate fixation period expiring at least two months before the expiration date. Additionally, banks were due to inform the clients about the change of the interest rates on their housing loans for the upcoming fixation period at least two months before the change should occur.

The information responsibilities of banks towards their clients should have resulted into clients' possibilities to rationalize their financial decision by comparing different banking products available on the market. By these means the market principle of free competition was supported as the informed customers were able to make well-informed financial decisions.

The State Interest Rates Subsidy (Bonification)

The state commenced to significantly influence the housing loans market as it introduced the state bonification in 2000. The state bonification came in various forms which used to change throughout the time.

- *The historical bonification* took place in 2000 – 2004 in the volume of 6% in 2000 falling towards 1% in 2004.
- *The state bonification for the young* was launched in 2007 to the extent of 1,5% in the beginning gradually increasing to 2%
- *The state bonification for the newly married couples* was introduced in 2007 in the level of support as high as 3%.

The historical bonification and the bonification for the young were being used to the greatest extent. They are, however, built on different principles.

The historical bonification provided a state donation of fixed percentage of the loan for the whole time of repaying the mortgage. In other words, the customer made a contract with the bank with a certain level of the interest rate of which a fixed part was covered by the state. If the customer decided to refinance his loan and move it into another bank, he would lose the state benefit. This was the rule by 2011. Due to this situation, the clients were locked up in one bank since in case of loan refinancing they would lose the state bonification. Owing to the steep fall of the interest rates, the historical bonification became nothing else than reimbursing the banks' profit.

The latter type of the state bonification - the bonification for the young - was introduced as early as 2007 and its principle was to favour certain groups of the population, however, under condition that the bank itself had contributed to decreasing the standard interest rate for the same loan. This principle has been preserved in the Slovakian bank system until these days. Notwithstanding, some analyses suggest that the state bonification in fact only funds the profits of the loan providers who artificially set the standard interest rate higher. The example goes as follows:

- A client requests a housing loan with the state bonification for the young
- The bank offers him the market interest rate of 4.5%
- The bank provides a discount of 1% and the state provides bonification of 2%
- The final interest rate for the young client would be 1.5%, however, for the rest of the clients who are not entitled to the state bonification the interest rate would be 3%.

The housing loans analysis by the IFP in 2010 - after introducing the state bonification - suspects that the banks do not decrease the interest rates by the full extent of the state bonification but keep a significant part of it to their own advantage *(The expenditures of the state budget on housing loans bonification consisted of overall 14,3 mil. €)*. According to the director of the IFP Ján Toth, the data suggested that the banks accepted the state funding under unfair interest rates conditions in order to derive an unjustified profit.

Non-transparency of the Interest Rates

Until the year 2011 the Slovak banks were completely free to set and change their offered interest rates whether in the case of the fixed interest rate or in the case of the variable interest rates. This was done without any clear mechanism of deriving the new interest rates from the old ones *(For instance, in 2005 UnicreditBank was offering a housing loan called "transparent mortgage" which had interest rate consisting of EURIBOR margin along with fixed margin which was constant throughout the whole leasing period)*. This type of changeable interest rates had been forbidden in other countries at that time, such as Germany and Austria.

The interest rates were usually stated in their absolute height in the lease contracts and were not bound to the benchmark that adjusts the interest rate over time, e.g. EURIBOR. The given situation made it harder to compare different loan conditions and made it possible to change the interest rates in the future according to the banks' free will. A number of amendments attempted to solve the informational asymmetry between the banks and the clients

so that the clients could be informed on time which would allow them to act in their best interest. Among the other things, these amendments also introduced:

- *Uniformed terminology*: The law defines the calculation of the interest rate for housing loans as the composition of the standard interest rate and the gross margin. Furthermore, the law establishes an obligation to state the standard interest information expressed in %. Lastly, the law defined the gross margin as the interest rate margin expressed in %.
- *Transparency of the interest rate*: The bank is obliged to inform the client about the interest rate in a way that the standard interest rate (published on the website of the bank) and the gross margin of the bank (which expresses the margin of the bank and the level of risk of the client) are stated in their basic volumes separately. These two compose themselves into the *total interest rate*. This way the client achieves a more detailed overview of whether the interest rate given to them is changed by the market situation or by the bank's product portfolio modification.

3.4 Estimation of the Policy Changes Impact

The policy changes conducted since 2010 were mainly concentrated on increasing contestability by making housing loans easily portable when the interest rate resets. From 2011 on, the law stated that the debtor could repay a housing loan without any additional fees or penalties whenever the interest rate was due to reset. This was extended from mortgages to all types of housing loans and an additional regulation was introduced to prevent banks from ignoring or sabotaging the right. Given the sharply decreased interest rates since 2009 as well as relatively short duration of interest rate fixation for a large percentage of housing loans, this kick started interbank competition not just for new housing loans customers, but also for refinancing of existing loans.

The following figures illustrate the impact of the introduced changes. Figure 3 shows the profit margin development since 2009 - before the policy changes have been adopted until 2015. The graphs clearly show the decreasing trend.

Figure 3. The development of the margins
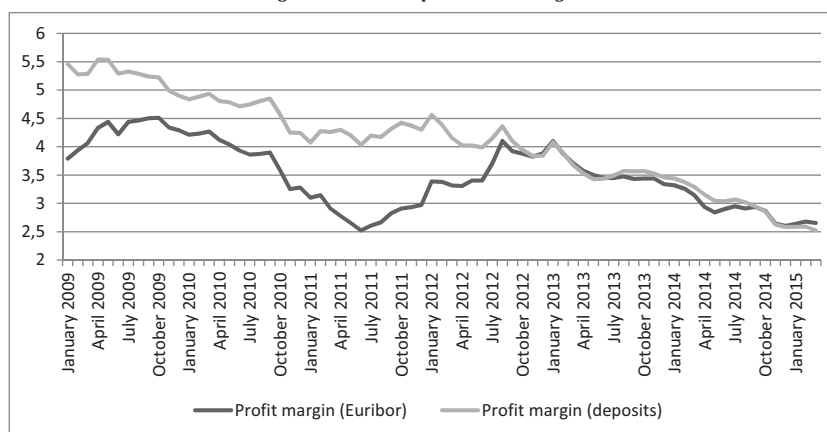
Source: Authors based on The IFP data

Figure 4. The development of the interest rates of the housing loans
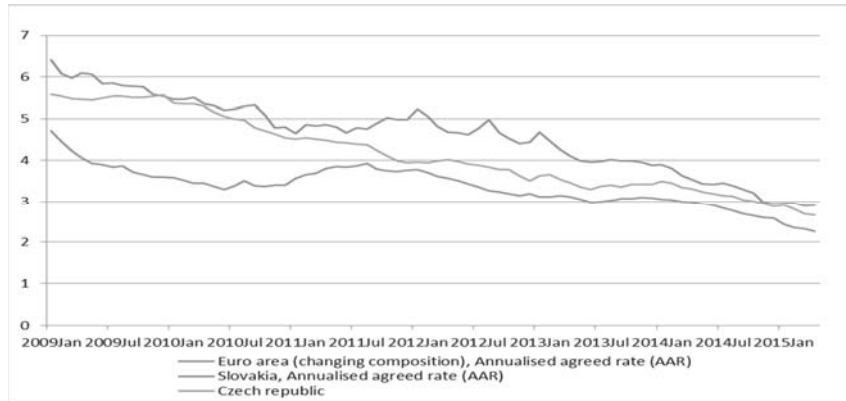
However, the change of regulation was obviously not the only factor contributing to the decrease of the Slovak interest rates. To provide a first-order estimate of the savings that can be attributed to the increased contestability due to regulation, we took actual interest rates prior to full effects of the regulation and then extrapolated two trends. The first one (blue line) is a linear continuation of the actually observed trend – it is the counterfactual estimate of what would have happened without the regulation. The second one (red line) is a linear trend based on actual data and thus represents actual decrease after the regulation. The difference between the two trends can be seen as a first-order estimate of consumer savings due to the change. It can be seen that the difference reached 0.6% by 2015.

Figure 5. Savings from higher contestability: Actual housing loans interest rates before the regulation and extrapolation of paths without and with regulation.
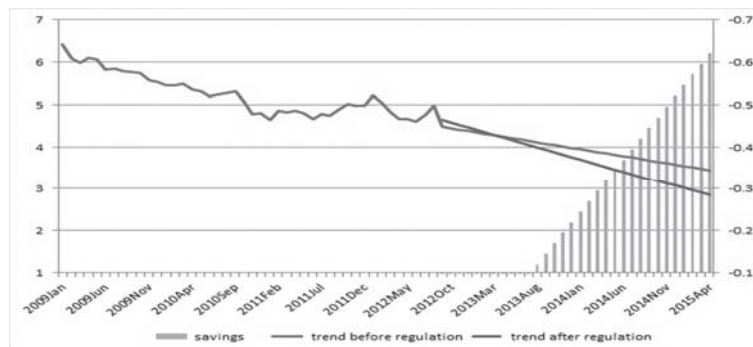
4   Conclusion

The case study concentrated on the development and the cumulative impact of the three policy factors (the interest rates, the state interest rates subsidy and the market contestability) applied since 2010 – 2015 on the housing loan market in Slovakia. It showed that increase in

competition in the market for refinancing of housing loans went hand in hand with significant decrease in the interest rate charged beyond what can be explained by other market factors. From policy perspective it indicates the need for evaluation of the policy impact and for the continuing policy changes to reach required impact in the field of multiple actors and multiple factors.

Acknowledgements

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Method of Non-weighted Average Absolute Deviation in Context of Income Inequality. Case Study of the Czech Republic

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Abstract

The aim of this present paper is to introduce the alternative new method to express and measure income inequality in the society and in the economy. There is presented use of the method of non-weighted average absolute deviation for expressing and comparing income inequality in case of Czech Republic in years 2005-2013. The result of measuring of income inequality usingh method of non-weighted average absolute deviation is, in practical part of article, compared to 3 other, well-known traditional indicators - Gini coefficient, Robin Hood Index and S80/S20 Ratio in order to highlight compatibility between all these methods to measure income inequality. Through correlation analysis was confirmed a high positive correlation between the levels of income inequality expressed by mentioned methods. The analysis of income distribution will be made in deciles based on empirical data from the European statistical office, Eurostat. The text after Introduction is organized subsequently: the second part explains the theoretical approach of the method of non-weighted average absolute deviation. The third part contains the conceptual framework of empirical analysis and results of income inequality and the Conclusion highlights some major conclusions of detailed analysis made in previous chapter. According to results of income inequality comparison of measuring via standard method author recommend to use the new one especially for its easy calculation based on commonly available data in the required format provided by statistical offices.

Keywords: income inequality; method of non-weighted average absolute deviation

JEL Classification: C13, D31, I39, O15

1 Introduction

Income inequality was and also is a natural part of every economy and its society. Income inequality in essence means that different people or different groups of people will reach different income and this income dispersion determines how much the great range of individual income in society at the economy is. [10]

There are many possibilities how to look on or measure standards of living in selected countries. One of the best known is GDP per capita. Despite the fact that this indicator could reach relatively large value, it does not predicate differences of incomes in society. Another indicator we could hear about very often is average wage. Not even its amount is guarantee of economic well-being. It is usual that over 50% of working population of the country cannot reach this amount. One of the best known and used measures of income inequality is Gini coefficient and its graphical representation through Lorenz curve. It could be supplemented by Robin Hood Index and S80/S20 Ratio which are used as other methods of comparison of income inequality. [11]

This article is introducing and using new, alternative and relatively simple method for measuring, expressing and analysing income inequality in case of Czech Republic inhabitants in the period of years 2005–2013. Among well-known methods how to measure income inequality belong traditionally Lorenz curve, Gini coefficient, Coefficient of income inequality S80/S20 (or Quintile share ration or S80/S20 Ratio), Atkinson index, Theil index, Robin Hood index and Variation coefficient. For more information about these methods see for example [1], [3], [6], [7], [8], [10], [12] or [15]. Analysis of income inequality presented in this article is focused on method of non-weighted average absolute deviation that is not normally used in context of income inequality. This method is generally used to express and measure regional disparities

but the principle of this method is easily transferable also to measure other indicators in other areas and fields of study. The great advantage of using this method is its mathematical-algebraic procedure for calculating the coefficient expressing the degree of inequality directly adapted to the data format in which are data of income distribution provided by statistical organizations. In this present article is compared the level of income inequality measured by here used method with levels of income inequality determine by standard methods, such as the Gini coefficient, Index S80/S20 and Robin Hood Index. There was proven extremely positive and high correlation between the results and evaluation of income inequality by method of non-weighted average absolute deviation and aforementioned indicators. Analysis of income inequality through this mentioned methods will be based on empirical data of Eurostat in the chosen period of time for Czech Republic.

The rest of the article is structured as follows: the next section provides same theoretical approach to method of non-weighted average absolute deviation and its decomposition and gives information about methodology. Section 3, Empirical analysis of development of income inequality, contains the analysis of the income inequality in Czech Republic using the method of non-weighted average absolute deviation and other selected methods. There is also mention the development of income inequality during analyzed period of time and provides discussions about relevance of new method and its legitimacy through statistical verification. Finally the Conclusion concludes with some general comments.

2 Material and Methods

2.1 Theoretical Approach to Method of Non-Weighted Average Absolute Deviation in Context of Measurement Income Inequality and Methodology

The considerable part of theoretical introduction of method of non-weighted average absolute deviation is taken from another author´s publication. [13], [14].

Method of average deviation reflects the degree of variability, defined as the arithmetic average of the absolute deviations of individual values of observed indicators from the selected value (given point) (for more information about method of absolute average deviation see for example Tuleja [9] or Babu & Rao [2]. This method is traditionally used to express the regional disparities in the focal sectors. This method can be also named as Method of mean absolute deviation or simply Method of mean deviation. Generally, the deviation is reckoned from the ideal value, recommended value, central value that is constructed as some type of average, median, mean of the data set and other.

This value chosen here understands the value for the ideal distribution of income in society, ie. the value of expressing absolute equality in income for each inhabitants. In general absolute deviation is constructed on the basis of this formula 1:

$$d_i = |x_i - (x)| \qquad (1)$$

where: d_i presents the absolute deviation from i-th indicator,

x_i presents the i-th indicator (data element, variable),

(x) is the chosen given point.

Indicator (x) is the ideal percentage value of income which get in concrete the percentage of households in society (normative), for example, 10% of households get precisely 10% of total income $((x)=10\%)$. Variable "x_i" presents real household´s money income cumulated into relevant deciles, quintiles, quartile and other. Here we can give an example, that 30% of households got 16.7% of total income in Czech Republic in 2010 ($x_i = 16.7\%$).

Graphical display of the principle methods of standard deviation is shown in the following Figure (Figure 1).
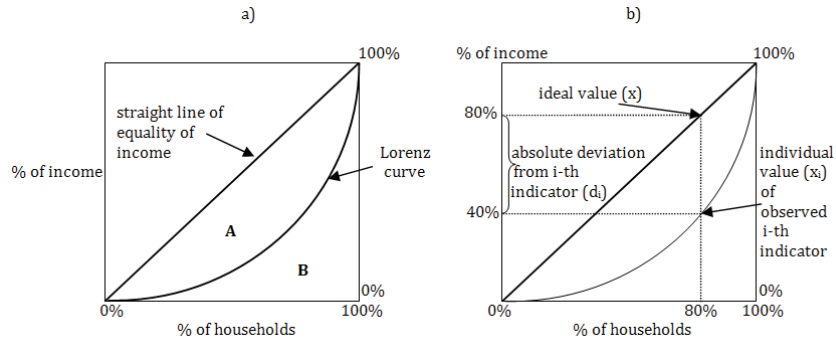
Own value of non-weighted average absolute deviation we obtained from the formula 2:

$$d_{ii} = \frac{\sum_{i=1}^{P} \left| x_i - \left(\overline{x} \right) \right|}{n_i} \qquad (2)$$

where: d_{ii} presents the average absolute deviation from i-th indicator (deviation for income inequality),

n_i presents the number of values of i-th indicator that we have available,

$(\overline{x})$ is the arithmetic mean of i-th indicator.

Value of non-weighted average absolute deviation (d_{ii}) can have values from 0 to 100 and if value of "d_{ii}" is lower (the more close to 0) than less income inequality is between the richest and poorest households in society. Perfect income equality in the society would occur in a situation where value would come out zero.

From a methodological perspective, the work is based on secondary data gained by Eurostat [5], concretely from the Population and social conditions, Living conditions and welfare, Income and living conditions, Income distribution and monetary poverty, Distribution of income by deciles as a share of national equivalised income for Czech Republic. The covered period includes years 2005-2013 because of missing credible data which is not available for a longer period.

Income is understood as a total disposable income of a household that is calculated by counting personal income received by all members of the household plus income received at household level. Disposable household income includes all income from work (employee wages and self-employment earnings), private income from investment and property, transfers between households and all social transfers received in cash including old-age pensions. [4]

Calculations of value of non-weighted average absolute deviation (d_i) are based on calculations using formulas (1) and (2). Calculations of Robin Hood Index, Gini coefficient and S80/S20 Index were carried out in standard general process. The software used was MS Excel and EViews 7. All calculations and graphical analysis is author´s own.

3 Results and Discussion

3.1 *Empirical Analysis of Development of Income Inequality in Czech Republic in Years 2005-2013 and Discussion in Context of Legitimacy of Method of Non-Weighted Average Absolute Deviation to Measurement of Income Inequality*

There were calculated values of 4 indicators (a new one, and three general) that are used for expressing income inequality. The development of amounts of each indicator is shown below in Table 1. For all indicators is an effect that the lower value (ratio, coefficient) is lower (more close to 0) then less income inequality is between the richest and poorest households in society in the region or period of time. How we can see in Table 1, income inequality decreased in the Czech Republic in the analyzed period. There was an improvement of income equality about 5% for Czech households during 9 years. Higher improvements in income equality through the S80/S20 Index (about -7%) can be explained by its process of calculation, when "it is calculated as the ratio of total income received by the 20% of the population with the highest income to that received by the 20% of the population with the lowest income". [4]

Table 1. Value of indicator and its change between years 2005-2013

Indicator/Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	% change
Dii	12.69	12.37	12.27	12.07	12.24	12.17	12.25	12.14	12.11	-4.57053
S80/S20	3.673	3.535	3.490	3.427	3.500	3.471	3.525	3.505	3.417	-6.96872
GINI	0.254	0.247	0.245	0.241	0.245	0.243	0.245	0.243	0.242	-4.49173
Robin Hood Index	18.20	17.70	17.60	17.20	17.40	17.30	17.50	17.30	17.30	-4.94505

Source: Author based on Eurostat

Table 1 is here complemented by Figure 2 which graphically shows the development of each indicator that was chosen for evaluation of income inequality.

Figure 2. Development of selected indicators which reflect income inequality in the Czech Republic in years 2005-2013

Source: Author based on Eurostat

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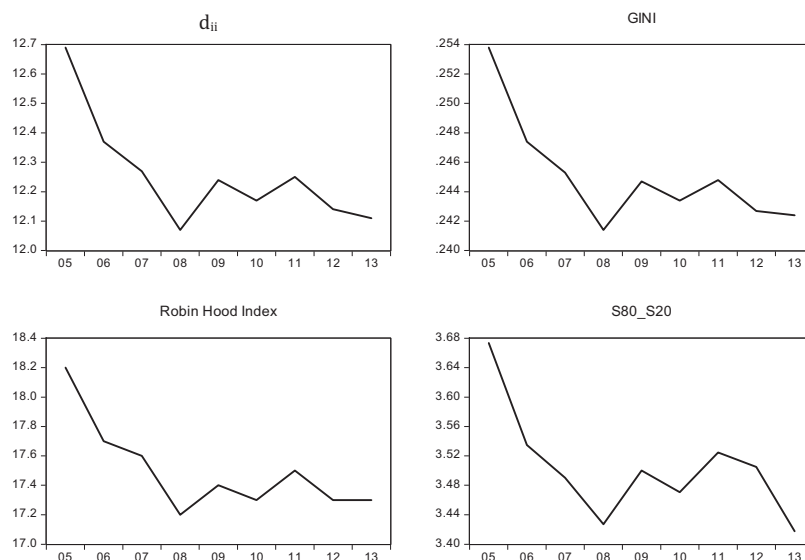
The aim of this article is to introduce new method of expressing income inequality. It is necessary to authenticate relevance and legitimacy of method of non-weighted average absolute deviation in context of measuring income inequality through statistics. In Table 2 is shown matrix of values of correlation coefficient and probability (on significance level 0.05). The correlation coefficient is so high because of input data. All calculations used the same data. It is also necessary to mention that there is not required a Unit Root Test about stationarity of data.

Table 2. Statistical test of correlation

Index Correlation Probability	d_{ii}	GINI	RHI	S80_S20
d_{ii}	1.000000			

GINI	0.999553	1.000000		
	0.0000	-----		
RHI	0.988813	0.989039	1.000000	
	0.0000	0.0000	-----	
S80/S20	0.953053	0.946609	0.924718	1.000000
	0.0001	0.0001	0.0004	-----

Source: Author

The correlation (interrelation) between three (four) indicators is very high which means that there is a high significant dependence between selected variables. So we can declare that method of non-weighted average absolute deviation could be used for measuring and expressing income inequality. The level of income inequality measured by this new method corresponds to the level of income inequality obtained by calculating by other general methods. Non-weighted average absolute deviation method can expand the existing portfolio of methods to measure and express income inequality between households in society.

The great positive of using the "method of mean deviation" is its easy calculation based on commonly available data in the required format provided by statistical offices while the negative is that the value of this indicator does not tell us anything about exact distribution between individual groups of households because of value of income inequality is calculated as the average over the period (the same "problem" is with Gini coefficient too). From this perspective of view the Robin Hood Index and S80/S20 Ratio are even more imprecise. It is also good to mention that since the correlation between the results obtained by the method of non-weighted average absolute deviation and Gini coefficient is significant, it is advisable to use the method of non-weighted average absolute deviation to express the deviation in income inequality instead of Gini coefficient which calculation is considerably more difficult.

4 Conclusion

The aim of this short paper was to present in theoretical level an alternative method of measuring and expressing income inequality. The eligibility and relevance of this method, method of non-weighted average absolute deviation, was checked in empirical part of this article through correlation analysis on data of Czech Republic for the years 2005 – 2013.

Non-weighted average absolute deviation method is simply method to express level of income inequality in the society and important positive of this method is to use it especially for its easy calculation based on commonly available data in the required format provided by statistical offices.

Non-weighted average absolute deviation method (method of mean deviation) can expand the existing portfolio of methods for measuring and expressing income inequality between households in society because of its comparatively simple feasibility while the results are comparable to standard and traditional methods of measuring income inequality.

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Pension Sharing

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Abstract

A proposal to introduce sharing of assessment base by spouses in the Czech social pension insurance is confronted with the pension theory and policy. The proposed "joint social insurance" should arise automatically, with the option of cancellation based on an agreement. The case has primarily confirmed the need to respect the basic concept of public pensions in the given country. The concept of pensions as entitlements of individuals, and not families, is in conflict with the mentioned proposal which cannot be overcome in the conditions of the complicated defined benefit system. After a potential transition to a notional defined contribution system the sharing of pensions would be feasible – but not necessary. A separate issue is potential dividing of pension entitlements in case of a divorce which can be implemented as a part of dividing the joint assets, regardless of the pension concept. The importance of dividing of pension entitlements is lower in the Czech Republic than in most other countries as a result of a relatively small gender gap in pensions, which is a result of the dominant role of an implicit flat-rate pension in the system. These conclusions are based on a system analysis of foreign experience.

Keywords: old-age pensions; widow pensions; gender gap; pension rights for divorcees; pension sharing

JEL Classification: H55, J16, J12

1 Introduction

The Czech Expert Commission for Pension Reform approved a proposal for "Sharing of assessment bases by spouses for the purposes of pension entitlements", the objective of which is to "ensure fair pensions for both spouses through a shared assessment base for calculation of the pension". This "joint social insurance" should arise automatically by marriage conclusion, similarly as the joint property of spouses, with an option of cancellation on request. The used terminology suggests that the Commission is not patterned on any distinctive pension theory and policy as there is no term of "fair pension", in this case even for "both spouses ". The "joint social insurance" is not a part of the professional terminology either. Nevertheless, the reform description clearly indicates the objective the Commission wants to achieve, which can be summarized as follows:

- The term "sharing" means to amalgamate assessment bases of the spouses in the pension pillar and to divide them equally; the sharing shall end by divorce, death or retirement of one of the spouses.
- The joint social insurance of spouses is an analogy of the joint property of spouses, including the option of cancellation based on an agreement between the spouses.

The paper's objective is to confront this proposal with the pension theory and policy. An analysis of published literature has shown that the topic of sharing of assessment bases for calculation of pensions has not been examined in detail in the Czech Republic. For example, Klazar [7] observes that depending on the rates of return the funds from the premiums are redistributed from men to women, particularly to the poor ones. There is still a long way from those studies to the issue of potential sharing of pensions by spouses in any form.

Nevertheless, the proposal to share assessment bases in the Czech "pension insurance" is not new. The Final Report of the pension Commission headed by Bezděk, issued in 2010, proposed the following:

1. After the reform starts (scheduled in 2015) the lifelong payment of widow and widower pensions should be canceled... The original concept of the entitlement

has become obsolete, it does not meet any legitimate purpose and it is very costly. This measure will not affect pensions granted before the said date.

2. The mechanism of sharing of assessment bases by spouses should be introduced to ensure division of earnings of both spouses for the purposes of determination of their pension entitlements [3].

This proposal to introduce sharing of assessment bases by spouses was not described in detail. A text with the same content was also approved by the then National Economic Council of the Government. Meanwhile, a study was published in 2009, which came to the conclusion that "the application of the concept of sharing of pension entitlements acquired in marriage could not be recommended with regard to the current method of pension calculation" [4]. The mentioned proposals of 2010 to cancel the lifelong payments of widow and widower pensions and to introduce sharing of assessment bases by spouses were not explicitly interconnected, although their interconnection is intuitively perceivable. In the following years some politicians embraced the idea of sharing of assessment bases, without connecting it with cancellation of lifelong widow and widower pensions. According to the Christian Democrats [6], the purpose of "sharing of assessment bases by spouses for the purposes of pension entitlements" should be an increase of pensions for parents on the base of a very general phrase ("fair pension for both spouses"). In 2014, Bezděk expressed his opinion of the Commission´s proposal more specifically: „I support such a proposal, as long as it is connected with cancellation of newly granted widow and widower pensions. This may result in long-term fiscal savings and, at the same time, we will not have situations in which the "prior" wife, after thirty years of marriage, loses any entitlement to future widow pension after her ex-husband – in the new system the thirty years of joint life would be reflected in the assessment base" [11]. Bezděk uses the argument of divorce. The need of a broader "framing" of such proposals is more than obvious.

In the current situation it is necessary to perform a principal qualitative system analysis of sharing and dividing of pensions from the viewpoint of social models or rather social philosophy. Only based on such an analysis we can deal with the role of the widow and widower pensions in the basic pension models, gender gap in pensions, "economies of scale " in case of shared households and, last but not least, the practices of sharing of pensions abroad and division of pension entitlements in case of a divorce. Finally, we will analyze principal preconditions for potential meaningful application of sharing of pensions by spouses in the Czech conditions, in the context of the entire pension policy or potential pension reform.

2 Material and Methods

A qualitative analysis of the material (topic) may rely on interpretation presented by two world's leading experts. "The design of pension systems, like the design of an income tax, is no accident but depends heavily on the social philosophy that underpins it. Specifically, does policy regard a woman primarily as an adjunct of her husband, hence covered by his pension contributions, or primarily as an autonomous individual, earning a pension in her own right? The former view was common in the past but has been rejected in many countries in favor of a view that recognizes autonomy but also a woman's role as part of a family. The latter view prompts a policy drive to adjust labor market and pension institutions to strengthen women's earnings and encourage labor force participation; it also influences views about how an equitable pension system might look. Such views are in part a matter of social values, on which countries differ, just as they differ in the mix of one- and two-earner couples and the prevalence of marriage. … Policy should not focus only on the design of the pension system itself, but should also be cognizant of the impact on eventual pension benefits of other policies concerning, for example, the taxation of earnings, subsidies for child care, all-day schools, and regulations about flexibility of work for parents of young children." [1].

While recognizing a number of links between pensions and the entire social policy – with regard to the above-mentioned Czech discussions about sharing of assessment bases – it is instrumental to briefly reflect on the indicated reasons for the sharing in a situation, in which

the approach to pensions in our country is fully individualistic – and the sharing of assessment bases would mean a fundamental change of this approach. Meanwhile, the individualistic approach to pensions is linked to the individualistic approach to wages and to incomes of self-employed persons. It is considered natural that the incomes are paid exclusively to the earning persons – and that they are not "shared" (divided between) by spouses equally. The spouses are supposed to use the incomes jointly, in mutual agreement. This often does not happen but the state does not intervene. Why should the situation be different when it comes to retirement or even disability pensions? I can hardly find any justification for the very sharing of pensions – regardless of the method of its execution. Are we supposed to approach old people differently than the others who are earning money? These questions have not been asked by expert papers because the answer to them is essentially very simple: no such problems exist in a functional marriage and therefore there is no generally accepted reason to legally regulate sharing of not only wages but also sharing of other incomes of spouses, including old-age pensions.

Sharing of assessment bases in a functional marriage can make sense only as a financial and technical preparation for a divorce. In the form proposed by the Czech Pension Commission in late 2014, the sharing of assessment bases by spouses makes sense only if the state wants (and is able) to create, in advance, financial and technical preconditions for division of pension entitlements in case of a divorce. A discussion about the material concept of the act regulating sharing of assessment bases by spouses and registered partners in the working group of the Pension Commission in September 2015 confirmed that the intent was not viable in the conditions of the existing Czech system of pension insurance – for legal (even constitutional), as well as technical reasons. The reason is obvious: we have a very complex defined benefit system, with a number of institutes and provisions of a redistributive and also restrictive nature. If we had a simple notional defined contribution (NDC) system then it would be easy to transfer clients' funds between their personal accounts in the system. Introduction of pension sharing instead of the proposed sharing of assessment bases is thus conditional on a paradigm pension reform. Even in this case a question remains why the state should create preconditions for pension sharing between spouses, or even order such sharing, or possibly support it by a default provision that the sharing occurs automatically and it may be cancelled based on an agreement between the spouses. It is also useful to find out how the issue is addressed in other countries.

Division of pension entitlements in case of a divorce is in most countries seen as an important and strongly independent issue. Choi [5] used data from 12 OECD countries and classified their approaches into three groups:

- The problem is ignored: divorce is not a reason to change the pension entitlements because they are seen primarily as rights of the individuals and not as derived rights or joint rights (Finland, Sweden).
- Sharing of pension entitlements or sharing of pensions acquired at the time of marriage or cohabitation: after a separation the entitlements or pensions are combined, divided into halves or as agreed or as decided by a court (Canada, Germany, Switzerland, UK).
- Special provisions about pensions of the divorced (Belgium, France, US, UK): e.g. in France the existing widow pension is divided among all (ex) wives of the deceased, depending on the duration of each marriage; in other countries, under certain circumstances (in the US the minimum duration of marriage is 10 years) the rights otherwise granted to the wives/husbands are partly preserved.

Division of pension entitlements after a divorce/separation is clearly based on concepts of the individual pension pillars, which is not expressly indicated by Choi – but it is clear from the fact reported e.g. for the UK, which has a complicated system of flat-rate pensions – and divorce is "only" an extra complication in this pillar. In the other pillars it is less complicated. It is essentially possible to agree on any solution in case of a divorce and the court decisions are also based on specific conditions in the individual cases. Different approaches in agreement with concepts of the individual pension pillars are also used in Sweden, where pension splitting is possible for the "premium pensions", i.e. for the minor national pension pillar.

Division of pension entitlements in case of a divorce is an unknown concept in the Czech Republic. The "economic" space for legal regulation of the division of pension entitlements is smaller than e.g. in Germany – with regard to the fact that the key component of the absolute majority of all Czech old-age pensions is the implicit flat-rate old-age pension amounting to ca. 30% of the average national wage – and therefore there is nothing to divide because in a typical case both spouses have this same component. The lack of transparency of the Czech "pension insurance" is an obstacle also for the division of pension entitlements in case of a divorce. As mentioned before, a transition to a system of explicit flat-rate pension plus NDC pension would make the situation more transparent, as mentioned above. When it comes to the third pension pillar, the situation is similar – there is money in it to be divided and the division would be easier with a legal regulation. However, divorced spouses should always have the option to reach an agreement about their assets as a whole – it is not necessary to divide all individual savings (and debts), including potential future pensions or current balances on accounts or in premium reserves of private life insurances.

From the professional point of view it is impossible to address the issue of sharing of pension entitlements without relating it to the survivor pensions. Moreover, widow/widower pensions are not a standard part of all systems of public pensions. Also in this respect the pension theory and policy has several alternatives, we may distinguish several social models. The liberal pension model does not address the widow and widower pensions at all; assurance of a "fair pension for both spouses" in a modern liberal system may in the extreme case mean that a couple (spouses) gets a joint flat-rate pension, which will be adequately lower (thanks to the economies of scale – joint housing) than a sum of two flat-rate pensions of the individuals. The problem of this kind (better quantification of the economies of scale) was evaluated e.g. in New Zealand. The social democratic pension model is based on the idea that the pension rights are individual rights [5]; spouses shall not have any advantages. Survivor pension is justifiable only for a limited period of time, up to one year, so that the surviving spouse can adapt. And even here it makes sense to take into account economies of scale in the solidary pension pillar.

The conservative pension model is historically associated with widow pensions. The model also includes a salary supplement for active civil servants with wifes. It is a "civil service model" which anticipates that the servant is a breadwinner of his wife (regardless of children) – in the case of his death the wife shall receive an unconditional widow pension which replaces the husband's maintenance obligation. In this model the wife is not supposed to have any gainful occupation – due to her status. On the contrary, a widower pension in this system is absolutely rare because the gainful activity of a woman – public servant – is a non-standard situation. A widower is expected to have a gainful occupation and therefore a widower pension makes no sense. It is a "zero concept" of widower pensions. The widower pension is only granted in very exceptional cases – if the widower was unable to work and was fully supported by his wife. The civil service model of this form had existed relatively long. Widow, and potentially also widower, pensions had existed even in the original systems of social pension insurance for blue collar workers but they had been conditional on raising of children, disability or old age – which is something completely different; a substantial role had been played by the efforts to limit poverty.

At present, the conditions of entitlement to widow and widower pensions in the social insurance systems must be the same – on the grounds of equality of men and women. In many countries this has been achieved by increasing of widower pensions to the same level as the widow pensions, boosting pension expenses. The existence of now equal widow/widower pensions in the conservative social model can be derived from its orientation on family as the basis of the society. However, in practice it is not the case. Pension systems of the conservative type have a relative weakness as they do not sufficiently support low-income groups of population and for this reason the widow/widower pensions are mostly analyzed as tools to eliminate poverty of women (and, to a smaller extent, also of men) in old age [8]. A strong solidary pillar (tier) significantly reduces the overall importance of widow/widower pensions in the system which includes social pension insurance. This is also the case of the Czech Republic.

Differences between old-age pensions of men and women are measured with the indicator called gender gap in pensions (GGP):

$$GGP = 100\% - \frac{APF}{APM} * 100\%$$

where APF = average pension of women
         APM = average pension of men (in the same age category as for the women).

The gender gap in pensions is compared with the gender pay gap and other indicators. Figure 1 shows the two gaps in EU; the pensions and wages are indicated before taxes. The weighted average of GGP for the entire EU is 39%. Extensive foreign sources indicate that the gender gap in pensions is a result of three facts: women are less represented on the labor market, they work less hours / years and they have lower wages. This can be changed only through integral conceptual solutions of the family policy because the space for adjustment of pension entitlements is small (e.g. to take account of care of senior persons). For us it is essential that the gender gap in pensions in the Czech Republic is one third of the EU average value and that it is significantly lower than the gender pay gap, unlike in most EU countries. The gender pension inequality is in our country significantly smaller than e.g. in Germany and it does not have to be "addressed" as a separate problem.

Figure 1. Gender Gap in Pensions vis-à-vis Gender Pay Gap, 2010, Pensioners 65+
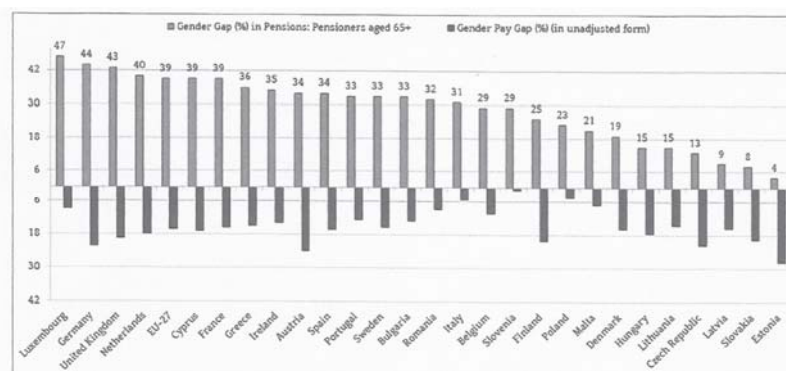
Source: [2]

Widow and widower pensions reduce the value of the gender pension gap indicator, however, they may not necessarily reduce the gender inequality in pensions. The widow and widower pensions do not represent redistribution in favor of women but redistribution in favor of official couples. This can be also formulated as subsidizing of the spouses by the singles. And that double-income families subsidize families with only one income. These pensions discourage women from working and support their dependence on the family income [10]. From the liberal and social–democratic viewpoint, there are enough reasons to cancel public widow and widower pensions. Some conservative countries have shifted their family policies significantly towards the social–democratic model by stressing the role of public services in raising of young children so even here the relative importance of widow and widower pensions decreases. Under such conditions the pension sharing in those countries may be approached at most as a reform step to facilitate cancellation of widow and widower pensions – by this reform pension expenses may be significantly reduced [10].

It remains to analyze sharing of public pensions found in three countries: Switzerland, Germany and Canada. Switzerland has a specific solidary pension pillar which provides income-related pensions but within a relatively narrow range defined by the minimum (16% of the

average national wage) and the maximum at the level of the double minimum. The system is incorrectly referred to as social insurance, it is funded from income tax and state subsidies. A reform from 1997 cancelled provision of joint pension to married couples as anachronism (the concept of a family with one breadwinner) and it introduced pensions for individuals, while incomes of the spouses are added up and divided into halves for the purposes of later pension calculation. The solidary pension pillar also includes widow/widower pensions amounting to 80% of the old-age pension of the deceased spouse. In case of concurrent entitlement to the old-age and widow/widower pension only the higher of them is paid. In fact, the role of the widow/widower pension is a potential supplement to the old-age pension from the solidary pillar.

The German pension "splitting" is also highly specific. It was introduced as an option from 2002, along with the introduction of "small" widow/widower pensions, which are granted only for a period of 2 years. If a couple decides for splitting then they lose the entitlement to the (big) widow/widower pension. The option has been used only by few couples – for most of them it is not profitable [5].

Canada uses "pension sharing" within the public insurance pillar called Canada Pension Plan – the couples may divide their pensions from the pillar into halves after reaching the age of 60; the total amounts of pensions do not increase by that. Sharing in the Canadian practice makes sense only if it reduces the income tax. Widow and widower pensions in the Canadian pension pillar exist, in case of concurrence with own old-age pension there is a certain reduction. Pension sharing does not have any impact on widow/widower pensions because the sharing ends by death of the partner.

Sharing of pension entitlements or pensions by spouses is being used only in the three mentioned countries and, based on the described systems, the Czech Republic may only partly use the German reform, consisting in significant limitation of widow/widower pensions: the introduction the pension sharing may "facilitate" the reform – from the political point of view.

3 Results and Discussion

The efforts to implement sharing of assessment bases have shown that at least in standard cases a systematic implementation is insignificant (increase of women's pension by up to 2%, reduction of men's pension by the same extent). The reason is the significant social structure of the Czech public pension insurance, demonstrated primarily by the existence of excluded periods [9]. Therefore workers of the Ministry of Labor and Social Affairs, in the effort to fulfill their task, created an alternative which does not use sharing of the individual years (assessment bases) but sharing of the entire period of marriage as a whole, while excluded periods should use fictitious (higher) assessment bases so that they are favorable for spouses. This, however, is a deliberate deviation from the existing system, with the objective to benefit spouses at the expense of others. Despite that, the overall effect of some alternatives (women without earnings) is negative for spouses. In my opinion, the presentation [9] proves that the entire concept, which was later approved by the Commission, is faulty.

Five years ago the Bezděk's pension Commission focused on introduction of the "second" pension pillar, while it paid only marginal attention to the first pillar ("pension insurance") – in this respect it only suggested some possibilities to reduce expenses on public pensions. The Commission recommended to reduce strongly expenses on the (newly granted) widow and widower pensions, quite in agreement with development of the international pension theory and policy. They also recommended to introduce sharing of assessment bases of spouses – without stating that it should be a tool facilitating a fundamental reform of widow and widower pensions – from the political viewpoint. Some political parties understood the recommendation as if the sharing of assessment bases of spouses were an useful partial pension reform, without any relation to a reform of widow and widower pensions, or they even approached the sharing as a populist program objective, as a tool to increase pensions, regardless of rationality and fiscal possibilities. Neither the Bezděk's Commission nor the political parties dealt with "technical"

possibilities of implementation of the concept of sharing of assessment bases by spouses. The existing Expert Commission for Pension Reform approved the proposal to introduce sharing of assessment bases by spouses without a thorough analysis, it did not take into account a cautious position of the respective department of the Ministry of Labor, motivated by the active efforts to implement the working version of the Commission´s proposal. Then it is not surprising that the proposal failed in the phase of discussion of the material concept of the act regulating sharing of assessment bases by spouses and registered partners, when opinions submitted by legal experts from the sector were strongly negative. From the legal and constitutional point of view, the proposal is essentially impossible to implement – yet due to the overall structure of the Czech "pension insurance ".

The author of this paper earlier expressed his opinion briefly as follows: "The introduction of sharing of pension entitlements requires a fundamental pension reform consisting in:

- division of the old–age pension into a flat-rate pension and an earnings-related pension (this is easy to perform),
- unification of the retirement ages for men and women,
- cancellation of widow and widower pensions (not retrospectively).

Without meeting of those conditions the sharing of pension entitlements during marriage would mean a major complication and a substantial increase of public expenditures. On the contrary, if the conditions are met the pension expenditures would significantly decrease. So most probably nothing will come out of it." [11].

4 Conclusion

Pension entitlements from all pension pillars, which arose during marriage and similar unions, are worldwide commonly viewed as a part of joint assets of spouses and in case of a divorce they have to be taken into account, equally as the other assets. The absence of this practice in the Czech Republic can be explained by the low (average) gender pension gap which is a result of clear dominance of the implicit flat-rate old-age pension over the insurance component in the Czech "pension insurance" system. To change the Czech divorce practice it is not necessary or expedient to introduce general pension sharing in any form.

The means-tested old-age pensions, including housing allowances for senior citizens, have been worldwide granted to cohabitating couples with a principal regard to the economies of scale which results from the shared housing and life in general. In this way it is possible to differentiate even between flat-rate pensions of couples and individuals but such a system also has an influence on the behavior of pension system participants and such circumstances shall be taken into account in any reform. This also applies for interconnection between the pension and family policies.

Widow and widower pensions have been reformed in many countries in response to changes in positions of men and women in marriage and in the society in general. In the past these pensions performed different functions, primarily in systems of civil service and blue-collar workers. In systems for civil servants and white-collar workers they expressed their social status and the usual total dependence of the wife on the husband; on the contrary, in systems for blue-collar workers the main purpose was partial protection of the families with (usually many) children against poverty in case of death of one of the parents. Such survivor pensions are now in the western countries historically anachronisms and it is possible and expedient to cancel them or not to grant them in the future. A practical solution in many countries is to limit those pensions for the maximum of one year, with an accompanying change of the benefit name, newly aimed at adaptation of the surviving spouse/partner to new conditions. Widow and widower pensions now represent unjustified redistribution from individuals to couples. A principal reform of widow and widower pensions in our country would introduce into our system not only more much needed equality but it would gradually create space for a potential increase or keeping of the replacement ratio of old-age pensions.

Potential political difficulties associated with cancellation of (new) widow and widower pensions may be limited by introduction of sharing of pension entitlements by spouses and by other official partners. General introduction of pension sharing is useless and in the current Czech conditions it is explicitly harmful because it cannot be implemented without a substantial conceptual change in the Czech "pension insurance" system and without significant impacts on public finance. Not to mention the increase of non-transparency and incomprehensibility of the system.

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Small and Medium Enterprise Development in Russia: Public Expenses – Are They Effective?

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Abstract

The purpose of this study is to explore the following issue: are public expenditures on support and development of small and medium-sized businesses in Russia effective? Within the framework of this study, the authors tested the following hypothesis: (1) the level of development of small and medium-sized enterprises in the regions of Russia depends on the level of State support for SMEs and (2) the level of development of SMEs in the federal subject of the Russian Federation depends to a higher degree on the level of the financial status of the federal subject, rather than on State expenditures to support SMEs in this federal subject. For detailed research of relationships included in the hypotheses, the authors formulated indexes that uniquely characterize the State support of small and medium enterprises on the scale of the federal subject (SSI), the federal subject's financial status (FSI) and level of development of small and medium-sized businesses in the federal subject (SMEDI), respectively. Methods of correlation analysis were used to analyze data for 83 federal subjects of Russian Federation for 2010-2014 years and the following results were obtained. The calculated coefficients of correlation showed a very weak relationship between the SMEDI and SSI. Therefore, we can say, that the level of development of small and medium-sized enterprises in the regions of Russia in 2010-2014 to a very small degree depends on the level of State support for the development of SMEs. However, relationship dynamics between the SMEDI and FSI in the form of a parametric curve is monotonically increasing, but it is not linear. Therefore, we can say that the level of development of small and medium business grows with improvement of financial condition in the average region.

Keywords: SME; SME development; public expenses; public fnance, financial standing; public finance management

JEL Classification: H5, H72, L26, O52, R11

1 Introduction

Modern economists frequently say, that small and medium-sized enterprises (SMEs) are in need of special Governmental support: there is a need for target financing, tax exemptions, and other possible forms of assistance for that critical and vulnerable segment of any economy. While the share of income in the form of taxes on small business in the Russian Federation, according to the Treasury of the Russian Federation (RF) for the year 2014 is 3.61% [11], the number of people employed in small and medium business in Russia has reached 24% of the economically active population [14], which confirms the importance of this segment, both for the economy and for society as a whole.

In this study, we will assess how effective are public expenditures on development and support of small and medium-sized businesses in Russia's regions: what determines the level of SME development in a federal subject of Russian Federation; is there a connection between the level of the financial standing of the federal subject and the level of development of small and medium enterprises in this subject.

In the current economic situation in the world small and medium-size business have significantly contributed to the economic growth. The famous economist, Peter Drucker, wrote that small business represent the main catalyst of the economic growth [4]. Socio-economic research in the USA and Germany have pointed out that 60-70% of the jobs' supply in the past years comes from the SMEs sector [8]. Economists are interested in various aspects of the development of small and medium-sized businesses, so, Choa and Maddalena in their research

examine which interventions and combinations of programs are more effective in enabling the poor to start up and grow their own business [3]. Mas-Verdú et al. study whether degree of business innovation, size, sector, and export activity affects firm survival [9]. However, scientists agree that governments should respond more actively to solve the growing difficulties faced by SMEs in accessing finance (injections of capital in loan guaranteed programs, direct lending programs, micro-credit loans and other guaranties), but should be designed also other interesting innovative schemes (public-private partnership, special dedicated investment funds with flexible structure) [13]. The simplification of laws, their transparency, reduction of the tax and administrative load, completion of building the infrastructure, support and improvement of the accessibility of financial sources are precautions which should help to sustain the development of SMEs [2]. Russian scientists state, that Russian model of fiscal federalism does not create incentives for economic growth, because it doesn't leave the territories to compete among themselves and thus dampens incentives for economic growth in the field [1]. Karpov in his work identifies key problems in the mechanism of the State support of small and medium-sized businesses [6]. They include subsidies asymmetry from the federal budget, late dates of receiving the subsidies at the regional level and their implementation, the imperfection of the methodology and grants programs evaluation of the State support of small and medium-sized businesses. Tereshchenko and Sherbakov received confirmation of significant positive correlation between the major institutional indicators and indicators of economic development in the regions [17]. They determined that the strengthening of the Institute for the protection of the rights of ownership and entrepreneurial activity can produce important synergies for growth as a separate region, as the entire economy of Russia. At the same time, according to some scholars, State support has a determining influence on the development of small business. It includes elements, created on the initiative of regional authorities (départements, councils, business incubators, science parks, etc.) [16].

2 Material and Methods

Taking into account current research to assess the effectiveness of support to small and medium-sized businesses in Russia and abroad [2, 7, 13 15], as well as on the results of the pilot project [10], we formulated the following hypothesis. We suggest that:

(1) the level of development of small and medium-sized enterprises in the regions of Russia depends on the level of State support for SMEs. The greater support of development of SMES receiving regions is, the higher level of SME development in them.

The second hypothesis concerns the fact, what factors does the level of development of SMEs in the regions of the Russian Federation (RF) depends on. We believe that:

(2) there is a connection between the level of the financial status of the federal subject of the Russian Federation and the level of development of small and medium enterprises in this federal subject. The level of development of SMEs in a federal subject depends to a large extent on the level of financial status of the subject, rather than the volume of State support (public expenditure to support SMEs in this subject).

The purpose of this study is to identify this connection, and the definition of its nature. Based on the study of Yashina [18] we believe that the better the financial status of the subject of the Russian Federation is, the better it is developing SMEs. The level of development of SMEs in the region we estimate in increase of the number of people employed in SMEs and increase of the share of taxes on total income (with subjects of SMEs) in tax income of the federal subject of Russian Federation: the better the small and medium business develops in a federal subject, the higher the share of taxes on income in the tax income of the federal subject. At the same time, financial status of the federal subject of the RF is determined by the structures of the revenue, expenditures of consolidated budget of the federal subject of the state, as well as the degree of budgetary commitments covering profitable revenues [18].

For the case detailed study of the links, described by hypotheses, the authors of the study formed the indexes that uniquely characterize the State support of small and medium

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enterprises on scale of the federal subject, the subject's financial status and the level of development of small and medium-sized businesses in the federal subject, respectively. Indexes are compiled based on the principles listed below, from the economic indicators which represent a statistical sample. Sampling principles are, for example, among others, include [5]:

- the principle of data reliability: use of official statistical sources to avoid receiving incorrect information;
- the principle of relevance of the data: the use of indicators that are directly (but not indirectly) related to the subject of the study;
- versatility: the selected indicators should describe a picture with various parties to avoid "lopsided" analysis.

Absolute indicators from official statistics processing was held in two steps. Aggregation was conducted as the first step and the second step was standardization. Aggregating the influence of several factors in a single index is necessary to obtain unique characteristics of the analyzed phenomenon. For example, the financial status of a federal subject of the Russian Federation is a complex economic category, which cannot be described by any absolute indicator. To estimate the financial condition of the region, we suggest to consider the four absolute indicators (tax revenue amount of the Federal subject in rubles, index of fiscal capacity, the amount of grants in rubles, the amount of subsidies in rubles). In this case, the composite indicator is required. The same need for aggregation of several indicators exist in determining the importance of Government support and the level of development of small and medium-sized businesses. Standardization (normalization) of indicators is necessary to obtain comparable estimates. Indexes allow to cumulatively take into account not only the current situation, but its dynamics, which allows to optimize the management decisions in Public Administration policy, giving timely assessment of current processes. In addition to research links between the level of development of small and medium business - the importance of Government support and the level of development of small and medium business — the financial status of the federal subject should operate with comparable indicators. Absolute figures from official records are not comparable and fail to take into account the time factor.

In the study, we used the data of the Federal State Statistics Service, the Federal Treasury, Ministry of Economic Development of the Russian Federation for the period 2010-2014 years for all 83 federal subjects of the Russian Federation (affiliated territories of the Republic of Crimea and Sevastopol for the year 2014 are not taken into account), so can be considered a representative sampled [11, 12, 14].

The prime criterion is the lack of sampling it linearly dependent values or their sets. In accordance with the foregoing principles the authors used the following set of statistics:

1. **In the group of State Support Index (SSI) are:**
   - the amount of funds allocated to support small and medium-sized enterprises (SMEs) from the federal budget and the budget of federal subject of the RF, in thousands rubles;
   - the tax revenue amount of the RF subject, in rubles.

The share of support for small and medium-sized businesses from the federal budget and the budget of the RF federal subject in total tax revenue, shows what priority segment of regional economy are SMEs in terms of territorial authorities.

2. **In the federal subject's Financial Status Index (FSI) are:**
   - grants amount to the budgets of RF subjects and municipal entities, in rubles;
   - subsidies amount to the budgets of the RF budget system (budget subsidies), in rubles;
   - tax revenues amounts of the RF subject, in rubles.

The level of estimated fiscal capacity of the RF subject, calculated in accordance with the methodology of allocating grants to equalize fiscal capacity of constituent entities of the Russian Federation. The share of subsidies received by the RF federal subject in total tax revenue, allows you to see the importance of unconditional financial support from the Federal Center in relation

to their own tax capacity of the region. Weight of subsidies in relation to total income may be called the donation capacity of the region. Donation capacity is higher in more financially-dependent federal subjects from the federal budget. The proportion of subsidies in relation to tax revenues – is narrower than donation capacity because it does not take into account the impact of non-tax revenue and grants from the federal budget. The share of subsidies received by the RF federal subject in total tax revenues, characterizes the importance of financial assistance on co-financing terms for certain purposes. Increasing the share of grants in income tax in the region should be evaluated as raising the possibility of a federal subject to the co-financing of joint projects. The budgetary provision of the RF federal subject is a relative measure, developed and applied by the Ministry of Finance. It is determined by the ratio between the calculated tax income per inhabitant, which can be obtained from the RF consolidated budget on the base of the level of development and economic structure and (or) the tax base (tax potential), and a similar measure in average consolidated budgets of the RF federal subjects, taking into account the structure of the population, socio-economic, geographical, climatic and other objective factors and conditions that affect the cost of providing the same level of budgetary services per inhabitant.

3. **In the Small and Medium-sized Enterprises Development Index in Federal Subject (SMEDI) are:**
   - the share of the tax, collected in connection with the application of the simplified taxation system in the tax incomes of the RF federal subject, (%);
   - the share of unified tax on imputed income in tax incomes of the RF federal subject, (%);
   - the share of unified agricultural tax in tax incomes of the RF subject, (%) *(The share of the tax collected in connection with the use of the patent system of taxation, has been excluded from the calculations because it did not apply in 2010 and 2012.)*
   - the population of Russian Federation, employed in Economics, thousands of people;
   - the number of employed in SMEs by region, thousands of people.

The share of income tax, collected in connection with the application of special tax regimes, characterize the contribution of SMEs to the formation of consolidated budget of the federal subject of the Russian Federation. The higher the percentage, the greater part of Gross Regional Product small and medium business produces. This is one of the indicators of the SMEs level of development in the region. The number of employed in SME in the subject is one of the clearest indicators, characterizing SME development level in the region.

State Support Index (SSI). The index is calculated by the following formula:

$$SSI_{jn} = \frac{(\frac{SS}{TRB})_{jn}}{\max_{T}((\frac{SS}{TRB})_j)}, \qquad (1)$$

where SSI – state support index, SS – support amount in rubles, TRB – tax revenue budget in rubles, T – a period of time (from 2010 to 2014), j – the number of the relevant region in the list of subjects of Russian Federation, n – the number of the year.

State Support Index for the certain year is equal to the relative amount of support to the tax revenue of the total budget of the subject followed by the certain year, to own a maximum in this region for the entire period of time. Normalization is performed in a temporary area, as researched in this article, relationship has the scale of the region (not country) and therefore the situation of the particular region in relation to the other is not indicative in this situation and, as a consequence, the normalization "by region" makes no sense. However, time is an implicit parameter of all values and indicators of our research because financial condition, State support and development of SMES subject in each year were different. Normalization in time allows to take into account the dynamics of the relationships between the indices, as well as standardize the index value range, bringing it to the interval [0.1]. The growth of the SSI means an increase in the proportion of funds allocated to support SMEs from the federal budget and budget of the

subject of the Russian Federation in total tax revenues. So, the State authorities believe SMES in a specific year to be a higher priority segment of the economy of a particular region, than in other years. Decline in SSI indicates a reduction of support in a given year relative to other years of the period. Growth is estimated as a positive factor, the decline is estimated as a negative factor.

Federal subject Financial Status Index (FSI). The index is calculated by the following formula:

$$FSI_{jn} = \frac{(BS+FC+1-BG)_{jn}}{\max_{T}((BS+FC+1-BG)_{j})}, \qquad (2)$$

where:

$$BS_{jn} = \frac{S_{jn}}{\max_{T}(BTR_{j})}, \qquad (3) \qquad\qquad BG_{jn} = \frac{G_{jn}}{\max_{T}(BTR_{j})}, \qquad (4)$$

$$FC_{jn} = \frac{FC_{jn}}{\max_{T}(FC_{j})}, \qquad (5)$$

where: FSI – Financial Status Index of the federal subject; BTR – subject' budget tax revenue in rubles, FC – a dimensionless index of fiscal capacity, G – the amount of grants in rubles, S – the amount of subsidies in rubles, j – the number of the relevant region in the list of federal subjects of Russian Federation, n – the number of the year, T – a period of time (from 2010 to 2014), BG – budget grants, BS – budget subsidies.

The interpretation of the financial condition of the subject using the formula (2) is subjective, but with this following transparent logic: an index is a superposition of a fiscal capacity indicator, the share of subsidies in the tax revenues and the share of grants in tax revenues. The latter includes minus, for reasons of clarity constructed record, because the greater the amount of grants, the worse prepared region sustainable livelihoods, to self-sufficiency. The FSI is changed in the interval from 0 to 1. FSI growth indicates improving the financial condition of the region in relation to the other years of the period analyzed. The growth index is considered to be a positive factor, the decline is considered to be a negative factor.

The Small and Medium-sized Enterprises Development Index (SMEDI). The index is calculated by the following formula:

$$SMEDI_{jn} = \frac{1}{2}\left(\frac{(TA)_{jn}}{\max_{T}((TA)_{j})} + \frac{(PE)_{jn}}{\max_{T}((PE)_{j})}\right), \quad (6)$$

where:

$$TA = STS + UTII + UAT, \qquad (7)$$

$$PE = \frac{NESME}{SPE}, \qquad (8)$$

where: TA - the share of total income tax amount collected in connection with the use of special forms of taxation; PE – the share of the population employed in SMEs in the economically active population of the region; STS - the share of the tax, collect in connection with the application of the simplified taxation system in the tax incomes of the subject; UTII – the share of unified tax on imputed income in tax incomes of the federal subject of the Russian Federation; UAT - the share of unified agricultural tax in tax incomes of the federal subject of the Russian Federation; NESME - number of employees in SMEs in the federal subject of the Russian Federation; SPE- the federal

subject's population, employed in Economics. All these indicators take the certain year for the j-region.

SMEDI changes in the interval from 0 to 1. SMEDI growth means increase the contribution of small and medium-sized enterprises in Gross Regional Product (GRP) and/or the growth of employment in small and medium business compared to similar indicators in other years of the period analyzed. The growth index is considered to be a positive factor, the decline is considered to be a negative factor.

When the indexes were formed, we investigated the relationship between them.

3 Results and Discussion

To study the relationship between the Small and Medium-sized Enterprises Development Index (SMEDI) and State Support Index (SSI) we used the tool of the linear correlation analysis. In our case formula for correlation coefficient is:

$$r_{SMEDI-SSI} = \frac{\sum_{j=1}^{N}(SMEDI-\overline{SMEDI})(SSI-\overline{SSI})}{\sqrt{\sum_{j=1}^{N}(SMEDI-\overline{SMEDI})^2 \sum_{j=1}^{N}(SSI-\overline{SSI})^2}}, \qquad (9)$$

where:

$\overline{SMEDI}$ - the index, value of the SME development level, averaged over the ensemble region,

$\overline{SSI}$ - the same, N – the number of studied regions.

Calculations according to the formula (9) yielded the following results:

2011: $r_{SMEDI-SSI} = 0.103858286$

2012: $r_{SMEDI-SSI} = 0.012653369$

2013: $r_{SMEDI-SSI} = 0.132295864$

2014 : $r_{SMEDI-SSI} = 0.196170146$

The calculated correlation coefficients show a very weak connection between the relevant indexes. This can be caused by a number of reasons:

- there is no connection between indexes;
- the connection is there, but it is not linear;
- initial data are a fatal error that is associated with the period of the global crisis, coincided with the timing of the study, and caused the non-linear one-time processes, that difficult to take into account.

Regression analysis involves the effect of approximation of real dependency values of some analytic function that is selected in accordance with several criteria (Fisher, etc.), the function must be a good match with the real dependency. This, in the face of a lack of data and their inaccuracies, is rather difficult to describe. The consequence of small correlation coefficients is the graph, more similar to stain than graph- this geometry is hard to approximate.

To talk about regression analysis makes sense, starting with the correlation coefficients > 0.7. Therefore, at this stage, we cannot use this tool, but it is the goal of our future work on this topic.

To study the relationship between the Small and Medium Enterprise Development Index (SMEDI) and the subject's Financial Status Index (FSI), we used the following formal approach:

- we took an ensemble average of regions SMEDI values for each year-depending on time;
- we calculated FSI values in the same way for each year;
- excluding time (as the implicit option) we patterned the relevant mean values on a coordinate plane.

The results are presented in Figure 1.

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Figure 1.Relationship dynamics between the Small and Medium-sized Enterprises Development Index (SMEDI) and federal subject Financial Status Index (FSI)
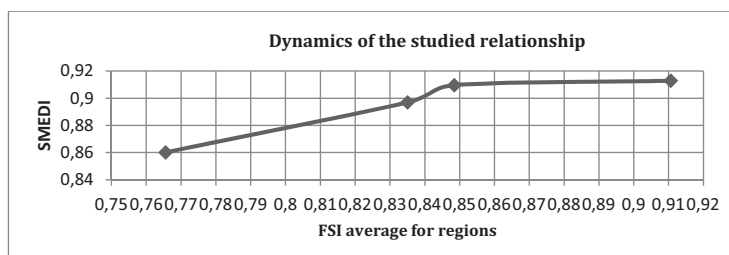
Source: Authors

We patterned a point on a plane, having following considerations: the level of development of small and medium-sized businesses is a reaction to the environment (favourable or not), and the reaction takes time. In other words, the small and medium business is inert. Therefore, the current level of development of SMEs meets financial status for the previous reporting period, and vice versa, the current financial status of the subject entails a level of development of SMEs for the next reporting period. Thus, we patterned on the horizontal axis, the value of the financial status of the subject of the Federation for 2010, and on the vertical axis – the level of small and medium entrepreneurship development for 2011. In the intersection set point and so on – till 2014 inclusively. Taking advantage of such an approach, we were able to evaluate the interrelationship of SMEDI and FSI indexes in dynamics.

4   Conclusion

Therefore, we can say that the hypothesis (1) confirms weakly - level of small and medium entrepreneurship development in Russia's regions during the period from years 2010 to 2014 in a very small degree depends on the level of State support for the development of SMEs, which reject the findings of Terebov et al. [16]. Parametric curve presented in Figure 1, is monotonically increasing, however, is not linear. Statistically random variable description using the medium is not complete, but it is already possible to say that the small and medium business development level grows with improvement of financial condition in the region, which confirms the hypothesis (2) and is consistent with the findings of Tereshchenko and Sherbakov [17], Bondareva and Zatrochová [2], as well as allegations by Drucker [4]. Thus, it becomes clear the qualitative behavior of investigated relationship. To obtain quantitative characteristics we need to use the tool of the nonlinear regression analysis. This is what we plan in our further research.

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Tax Evasion Views – European Values Study Results

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Abstract

Tax morale and compliance are currently high on the developed countries' governmental agenda. Tax policymakers search for ways to prevent tax evasion. Tax collection and inclinations towards tax evasion are related not only to taxation system features, but also to institutional and social factors, such as citizens' beliefs and values. We use the European Value Study survey and compare particular countries by their citizens' willingness to justify cheating on taxes and paying in cash to avoid taxation. The responses to the questions are scaled from 1 to 10, where 1 represents zero tolerance for tax evasion or paying cash, thus enabling it. The results show that in all European countries both answer scores reach a lower value than 4 on average. An interesting finding is the difference between the answers to the two chosen questions, indicating that more people are willing to justify cash payments rather than simply dodge paying taxes.

1   Introduction

The effectiveness of tax collection and the fight against tax evasion has become a major tax policy issue worldwide. The EU Commission has recently released its action plan on fighting tax evasion in the sphere of corporate taxes [7], also intensifying the struggle to suppress VAT fraud, as described, e.g., in [8]. Having initiated the BEPS project [18], OECD has recently launched a consultation campaign on tax audits (see [19]) for the developing countries to improve their tax collection.

Tax researchers and administrators focus on the scale of tax evasion. [12] and [11], for instance, estimate tax gaps in corporate and value added taxes for the UK and Sweden respectively. Studies [20] and [5], conducted for the European Commission, quantify the VAT gap which was estimated as an amount of EUR 177bn, representing 16 % of theoretical VAT to be collected in the EU member states on average. Another researcher ([6]) calculates a tax gap for a set of developing countries, using the estimates of the shadow economy under the assumption that the income drawn from it would be taxable. Numerous scholars, e.g., [10] and [17], explore the forms of tax evasion, comparing its scope in selected countries and considering it as a major barrier for more effective tax collection and sufficient financing of public budgets.

The shadow economy is a factor that affects poor tax reporting, paradoxically often originating in high-taxed and less tax-compliant countries. The shadow economy estimates have been published most recently in [22]. This paper indicates that the EU shadow economy decreased slightly from 22.3 % to 18.4 % of GDP, the decline having been slower in the late years of economic downturn than before it. The shadow economy includes practices that are performed outside the reach of public authorities, tax administration bodies in particular; taxable income underreporting and illicit work being the most common fraudulent activities (see [2]).

For the policymakers, however, the key question is what makes companies and entrepreneurs evade tax payments. With the knowledge of relevant motives behind entering the shadow economy and tax avoidance, politicians could introduce measures that would minimize or even eradicate this phenomenon. Obvious factors to be considered are the tax system characteristics (such as the tax rate, tax compliance costs, etc.), because they can naturally have

an impact on taxpayers' behaviour. The relationship between tax components and the scope of tax evasion has been researched by the following authors – [1], [14], [13] and [27].

Not only a country's economic and taxation characteristics are crucial for the level of the shadow economy or tax evasion; institutional and social factors can be conceived as even more important. However, very few studies have explored the influence of social aspects on tax evasion and the shadow economy in requisite details. [14], for example, took into account also legal and judicial efficiency measured by an index published in [16] as well as the tax morale of the population assessed by asking people about their willingness to increase the powers of local authorities. The latter factor is noteworthy, stimulating us to investigate the social factors of tax evasion. According to the expectations, both these variables are negatively related to the scope of tax evasion in society. The authors of [5], having analysed another social determinant – the index of corruption perception –, found its significant negative impact on the value of the tax gap.

The reason for a minor use of social indicators in the models searching for the determinants of tax variables is apparently the fact that these factors are difficult to measure. The lack of social variables for tax related research inspired us to explore the database of the European Values Study (henceforth "EVS") that provides comprehensive statistics on human values across Europe based on a large-scale survey. According to [15], "This unique database makes it possible to examine cross-level linkages, such as that between public values and economic growth; or between environmental pollution and mass attitudes toward environmental protection; or that between political culture and democratic institutions. " In [21], for instance, the EVS was employed to assess the "social capital" of European countries. The author explains which particular survey questions relating to trust and trustworthiness can be used to identify the social capital of the country. The value or index of social capital can then be applied, for example, in studying the rules of economic growth. For tax research, the database provides valuable information about European citizens' ideas, beliefs, views and preferences, indirectly determining their attitude to paying taxes as well.

The present paper mainly contributes to the EVS database exploration as well as to the choice of appropriate survey questions, facilitating the evaluation of respondents' attitudes to paying taxes in individual countries. Moreover, the raw EVS data having been further processed, some of the results obtained are presented in a graphical form. Our aggregate data may be used in further research on the linkage between tax evasion and social factors, thus enabling the tax policymakers to streamline the tax collection process in the most effective way.

2 Material and Methods

Having used the EVS data to fulfil the aims of the paper, we analysed them in more detail. The EVS carries out interviews with citizens of European countries every nine years to find out what they think about the basic human values, the questions covering the topics of life, family, religion, work, politics and society. We used the data set from the last (i.e. the fourth) survey wave which took place in 2008. It covered 47 European countries (regions), almost 70.000 respondents having been engaged. Representative multi-stage or stratified random samples of the adult population of 18 year and above olds (except Armenian 15+ and Finnish 18 to 74 year olds) were drawn. Standardized face-to-face questionnaire interviews were conducted between the years 2008 and 2010 (Finnish internet panel and Swedish postal survey being the exceptions).

For better comparison of similar countries, we have arranged them into three groups:

- EU-15 countries (*Austria, Belgium, Denmark, Finland, France, Germany, Greece, Great Britain, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden*),
- other EU countries (*Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia*),

- remaining European countries (*Albania, Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Georgia, Iceland, Kosovo, Macedonia, Moldova, Montenegro, Northern Cyprus, Northern Ireland, Norway, Russian Federation, Serbia, Switzerland, Turkey*).

As the present paper introduces our research, we start the analysis by descriptive modelling with the prospect of explanatory or predictive modelling to be carried out in future research phases. For the discussion of modelling techniques, see e.g. [25]. We picked the following two questions from within the EVS database that directly address taxation and an inclination towards tax evasion:

1) Do you justify cheating on taxes?

2) Do you justify paying cash to avoid taxes?

Both the questions are answered on a ten-point scale from *never* to *always*. We processed the raw data file gained from the database, having used the value 1 instead of *never* and 10 instead of *always*, thus obtaining an integer scale of answers from 1 to 10. The replies "don´t know" and "no answer" were excluded from further analysis, having been considered as missing.

For the descriptive modelling purposes, various descriptive statistics of the respondent's answers in different countries were calculated, some of them being presented here. We decided to introduce the measures of central tendency first since it may have been tricky (and difficult) to interpret the measures of variation, skewness and kurtosis in the very first step of our analysis as well. The higher the measure calculated for a particular country, the greater the tolerance of tax avoidance.

We computed and graphically presented the arithmetic means of answers per country despite the ordinal character of the variables (thus assuming that the "difference" between the values 1 and 2 is similar to that between 2 and 3, etc.). The means are suitable for ranking (i.e. comparing) the countries according their citizens' tendency to justify the behaviour leading to tax evasion. We also comment on the calculated medians in order to provide more information on the results from the perspective of particular answers' central tendency.

3 Results and Discussion

We sort the results by the groups of countries with the two questions placed side by side to allow for a better comparison of the reactions to each of them.

For all the country groups and both the analysed questions, the means are below 4, suggesting a restrained attitude towards the justification of cheating on taxes. The mean for the second question (justification for paying cash to avoid taxes) is usually higher than the mean for the first question (justification for cheating on taxes). This suggests that paying cash to avoid taxes is considered more acceptable than cheating on taxes in general. For the *other EU countries* and *remaining European countries*, the inclination to justify cheating on taxes is usually higher than in the *EU-15 countries*. This is not a surprising finding since the "old" EU countries have certainly a more developed institutional environment, lower level of corruption and more effective public sector. Therefore, their citizens are more willing to contribute to public budgets. The most significant difference between the justification for cheating on taxes and that of paying cash to avoid taxes is in the group of *EU-15 countries*.

Figure 1. EU 15 – The mean of question responses
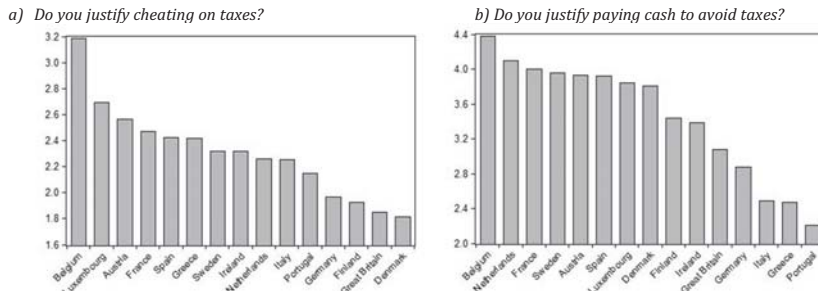
a) Do you justify cheating on taxes?   *b) Do you justify paying cash to avoid taxes?*

Note: The questions are answered on the scale from 1 to 10, where 1 means never and 10 always.

Source: [9]

As a comparison of the means of all the countries available suggests that Belgium has the highest values for both the questions, it also holds true for the medians. Great Britain and Denmark are on the opposite side of the spectrum with the mean lower than 2. We can compare these results to the level of the shadow economy for which comprehensive estimates across the EU are available. According to [23], Belgium's share of the shadow economy equals 16.2 % of GDP, its size reaching 12 and 9.4 % of GDP in Denmark and the UK respectively.

For the first question (justification of cheating on taxes), the median is 1 for all the *EU-15 countries* except Belgium (where the median is 2). For the second question (justification of paying cash to avoid taxes), on the other hand, the medians are much more diversified – the highest amounting to 5 for Belgium, followed by 4 for France and the Netherlands, 3.5 for Spain and 3 for Austria, Denmark, Finland, Ireland, Luxemburg and Sweden. Only Greece, Italy and Portugal show the median value 1 for both the questions.

Figure 2. Other EU countries – The mean of question responses
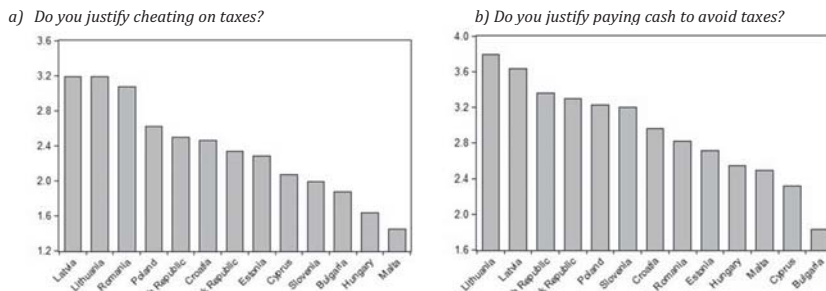
a) Do you justify cheating on taxes?   *b) Do you justify paying cash to avoid taxes?*

Note: The questions are answered on the scale from 1 to 10, where 1 means never and 10 always.

Source: [9]

As for the *other EU countries* group, there is the strongest tendency for the citizens of Latvia, Lithuania and Romania to justify cheating on taxes, whereas Hungary and Malta show the lowest means of the first question responses. The second question gives similar results regarding the two countries most prone to tax evasion, which are again Latvia and Lithuania. Having compared these results with the size of the shadow economy, we found similar rankings of Latvia, Lithuania and Romania with 23.6, 25.8 and 28 % respectively, followed by Hungary with 21.8 %, despite the interval between them being rather small. The results surprisingly

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indicate that Bulgarians, in spite of the largest size of the shadow economy of 30 % of GDP, do not tolerate cheating on taxes.

As for the "cheating on taxes" question, it also holds for *other EU countries* that the median is 1 for most of them. For the Czech Republic, Latvia, Lithuania and Poland, however, the median being 2. As far as the second question (justification of paying cash to avoid taxes), the median also suggests an ambiguous citizens' view since it reaches 3 in the Czech Republic, Latvia, Lithuania, Poland and Slovak Republic, and 2 for Estonia and Slovenia. For the rest of this group, the median is 1 for both the questions.

It is worth comparing the Czech Republic and Croatia, as the former is going to emulate the latter's example in introducing the electronic revenue collection system. Such a comparison often triggers the arguments for or against its implementation. [23], for example, provides data on the size and development of the shadow economy in 31 European countries, Croatia significantly exceeding, while the Czech Republic being below the average. Thus, it is worth noting that the survey results on citizens' values and opinions suggest a stronger (even though still relatively low) inclination towards the justification of tax evasion and paying in cash to avoid taxes in the Czech Republic compared to Croatia.

Figure 3. Other European countries – The mean of question responses
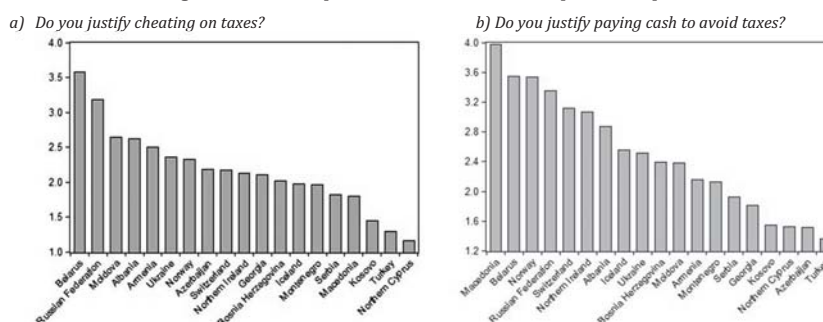
a) Do you justify cheating on taxes? *b) Do you justify paying cash to avoid taxes?*

Note: The questions are answered on the scale from 1 to 10, where 1 means never and 10 always.

Source: European Values Survey

Belarus reaches out the highest rate of tolerance to tax evasion among the *remaining European countries*. Belarus and Macedonia also reach a high score among those justifying cash payments. Turkey is on the opposite end of the spectrum. One of possible explanations of the diversity in this group's results is the role played by religion. Turkey with its high percentage of Muslims in the population may have shown lower tolerance of tax evasion or the respondents may have not admitted their ambivalent attitude. For the group of *remaining European countries*, the first question median (justification of cheating on taxes) is 1, except Albania (2) and Belarus (3). For most of the countries (including the latter two mentioned ones), the median is the same for both the questions, increasing with the second question (justification of paying cash to avoid taxes) only for Norway (3), the Russian Federation (2), Switzerland (2), Macedonia (3) and Northern Ireland (2).

4 Conclusion

In general, tax evasion is considered as wrongdoing in all analysed countries, respondents valuing the phenomenon at a scale from 1 to 10, the overall results not exceeding level 5 for both the questions.

The first high-level comparison of the EVS respondents' attitudes towards tax evasion and the shadow economy estimates shows that the link between these two variables is not as strong

as may have been expected. This may be caused by various reasons ranging from inaccuracies in the shadow economy estimates to the respondents' reluctance to provide truthful and open answers to tax morale questions. It is thus apparent that the survey outcomes need to be interpreted prudently and verified by further enquiry so that they can serve as a socially relevant basis for follow-up research on tax variable dependencies.

An interesting finding arose from the comparison of the two questions related to the justification of tax evasion, indicating that there are some differences in its perception between groups of countries – the noticeable one between general justifications of tax evasion and paying cash to avoid taxes. The citizens in most of the countries are more likely to justify the latter. This implausible approach may have arisen from higher penalties imposed upon organisations committing tax evasion than on those ready to pay in cash. There are more respondents approving of cash payments made without a receipt, thus avoiding taxation, than those willingly evading taxes in a different way, such as aggressive tax planning, deceptive accounting practices, tax fraud, etc. The above finding supports the plan to electronically collect the revenues as it will presumably discourage some of those who might be willing to pay in cash, thus reducing the opportunity for retailers and service providers to violate tax laws. An online revenue management project undoubtedly has both administrative and technological drawbacks that have to be taken seriously into account when implementing the system.

There are various ways of curtailing tax evasion. The electronic register, tax audits and more severe penalizing taxpayers for underpayments are coercive legal measures for fighting tax evasion. A recently promoted taxpayer-friendly client approach of tax authorities (discussed, e.g., in [3]) may facilitate smooth tax collection. Also, more businesses have started viewing taxation as an integral part of their corporate social responsibility (see [24]), "voluntarily" improving the tax collection, and thus making it more cost-effective for the tax offices as well.

Policymakers are ideally supposed to motivate their electorate to honestly bear their fair share of public expenses by paying the prescribed taxes. In the Czech Republic, the average tolerance for tax evasion and cash payments amounts to 2.5 and 3.3 points respectively; not a high score on a 1-10 scale places CR fifth and third in the *other EU countries* category. Nevertheless, there is still potential for improvement. The issue of ethical and social aspects of tax collection and administration is tackled by both academia and lawmakers, the latter shaping the tax environment. In the legal essay [4], the authors suggest that current taxation practices resting on *in dubio pro libertate* principle (and reflecting on judicial precedents) excessively promote a negative view of taxes as government imposed restrictions on business owners' rights, leading to the perception of taxes as a burden and punishment and showing an inclination to tax evasion/minimization. They plead for the recognition of the purpose of taxation – funding of the public sector – by the constitutional law, thus codifying that paying taxes is not a punishment but a civic duty and honour. Another author in [26], however, argues that the actual modern state and tax system complexities impede the perception of -paying taxes as "an honour" and contrary to [4], he considers *in dubio pro libertate* principle appropriate for such a complex system.

The present research paper on the social determinants of tax evasion aims to promote taxpayers' awareness by better understanding their motivation, values and opinions. Apart from the survey questions directly addressing tax evasion or its justification, the EVS database contains plenty of other items potentially related to the issue. Questions that tackle tax evasion indirectly, exploring the perceptions of life, family, work, morals, national identity, politics, society, etc., fall outside the scope of this paper. They will be identified and examined – alongside respondents' demographics – by our further research project.

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SESSION III:
PUBLIC SERVICES AND NON-PROFIT SECTOR

The Level of Education in Regions of the Czech Republic according to Census Results

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Abstract

Level of education has a significant impact in assessing the cultural level and quality of human capital in the region regarding to age, gender and educational level for the whole population. The paper presents changes of education level of population in the period 1991–2011 and interregional differences based on the census data of Czech population. The development of unemployment rate and average age of population in each education category is also mentioned. Significantly different from other regions is Prague having the oldest population, the highest education level and at the same time the lowest unemployment rate.

Keywords: age structure; census; education; Czech Republic

JEL Classification: J110, J120, J130

1   Introduction

The level of education of the population living in a region affects the development of the region. Also the role of the government plays an important role [5]. The system is also affected by regional authorities [8]. The level of education differs according to regions in the Czech Republic.

Among the most important outcomes of the census belong just the data concerning the education level of the population. Only in the census we can find data regarding to age, gender and educational level for the whole adult population. "*Pre-war Czechoslovak censuses in years 1921 and 1930 examined only the literacy of the population, i.e. the knowledge of reading and writing. The question of the highest completed education in our country was first included in the census in 1950.*" [2] In registries and demographic yearbooks there is no information about the education level of the population. Statistics of education provide data on students and graduates, but does not capture the resulting level of the education level of an individual.

After 1990 there came important changes not only in politics and economy but also in the education system. New schools and universities bring more opportunities for attaining higher education and there was also no discrimination in access to education on political grounds. The goal of this paper is to analyze the trends in changing education level of the Czech population in the period 1991–2011 and also show the differences between Czech regions.

2   Material and Methods

The analysis presented in this article is based on special data provided by the Czech Statistical Office for scientific purposes. Data represent the number of people from the census in 1991, 2001 and 2011, while classified by region of residence, sex, age at last birthday, marital status and education level. In this detail classified data are not normally available. Like other final results of the census 2011, the data relating to education are processed and published for the usually resident population, therefore categorized by place of habitual residence. (In previous censuses, which means in 1991 and 2001, data were compiled and published by place of residence.) "*Place of usual residence is defined as the place where a person normally spends his*

daily rest period, regardless of temporary absences for reasons of recreation, visits, business trips, healthcare facilities, etc., and where that person is a member of a particular household."[2].

For simplicity we considered only four main categories of completed level of education:

- Lower secondary education (ISCED 2) (including primary education and people with no education).
- Upper secondary education without direct access to tertiary education.
- Upper secondary education with direct access to tertiary education.
- Higher education – (higher vocational and university education – ISCED 5–8).

For children under 15 years of age the level of education was not investigated.

The following indicators of education level were used in this analysis:

- The proportion of people aged 20 years with upper secondary education with direct access to tertiary education or with higher education (with respect to all persons aged 20 years).
- The proportion of people aged 30 years with higher education (with respect to all persons aged 30 years).
- The proportion of people aged 30 years and over with higher education (with respect to all person aged 30 years and over).

Calculations and graphs were created in Excel using standard statistical procedures.

In the following text will be occasionally used the following abbreviations to refer to the Czech Republic and its regions (see Fig. 1):

- ČR – Czech Republic
- Pha – Capital City of Prague
- StČ – Central Bohemian Region
- JiČ – South Bohemian Region
- Plz – Pilsen Region
- Kva – Carlsbad Region
- Úst – Ústí Region
- Lib – Liberec Region

- KHr – Hradec Králové Region
- Par – Pardubice Region
- Vys – Vysočina Region
- JiM – South Moravian Region
- Olm – Olomouc Region
- Zln – Zlín Region
- MSl – Moravian-Silesian Region

Figure 1. Regions in the Czech Republic

Source: Authors based on [7]

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3 Results and Discussion

3.1 Development of the Level of Education of the Population of Regions of the Czech Republic in the Period 1991-2011

Distribution of the population by highest level of education between 1991 and 2011 is reflecting a gradual increase in the educational level of the population. In the census in 1991, the largest group of the population were people with secondary education without access to tertiary education, which accounted for more than 35 % of the total population. Even in the 2001 census and 2011 census was this level of education the most frequent one [3].

Significantly highest proportions of people aged 20 with upper secondary education with direct access to tertiary education or with higher education from people of the same age has Prague Region (Fig. 2). In 1991, it was 55% and in 2001 and 2011 already 70%. On the other hand, the lowest values in 2011 had the Karlovy Vary Region with less than 50%. While in the last decade of the previous century significant growth in the proportion of persons with this education level is especially apparent in the first decade of this century the proportion is rising relatively slowly.

Figure 3 shows the proportion of people aged 30 years with higher education. While the values in 2001 are similar to those in 1991, until 2011 the proportion of higher educated people aged 30 increased in all regions. The highest proportion (almost 43 %) was again in Prague, the lowest has Karlovy Vary region with a share of less than 15%. (But because of relative stagnation of the proportion of people aged 20 with upper secondary education with direct access to tertiary education in the last decade we can expect slowing down the increase of people aged 30 having higher education in the next decade.)

Higher differences between Prague and other regions are also in the share of people aged 30 years and over with higher education (Fig. 4). The proportion was in 1991 in Prague less than 20% but in 2011 nearly 30%. In other regions ranged in 1991 between 5-10%, in 2011 this value rose to nearly 9-17%.

In terms of educational structure is the position of the Prague Region exceptional. It is due to the concentration of universities in Prague and number of suitable and attractive employment opportunities for people with higher education. Prague has a three times higher proportion of people with higher education than Ústí Region and Karlovy Vary Region and twice as high proportion as its average value in the whole country.

In regions with higher education level the unemployment is usually lower and vice versa. In the period 1993–2014 the lowest unemployment rate was in Prague (where the education of inhabitants is the highest), on the other hand the highest unemployment rate was observed mostly in Ústí Region, Karlovy vary Region and Moravian–Silesian Region which have relatively low proportion of population with higher education level. (See Figure 5.)

Figure 2. The proportion of people aged 20 years with upper secondary education with direct access to tertiary education or with higher education

Source: Authors based on Census 1991, 2001 and 2011

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Figure 3. The proportion of people aged 30 years with higher education
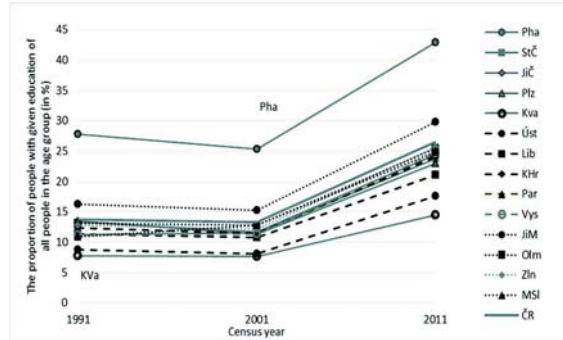
Source: Authors based on Census 1991, 2001, 2011

Figure 4. The proportion of people aged 30 years and over with higher education
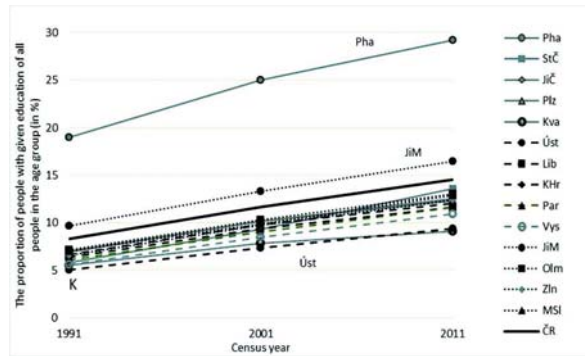
Source: Authors based on Census 1991, 2001 and 2011

Figure 5. Unemployment rate in the period 1993–2014
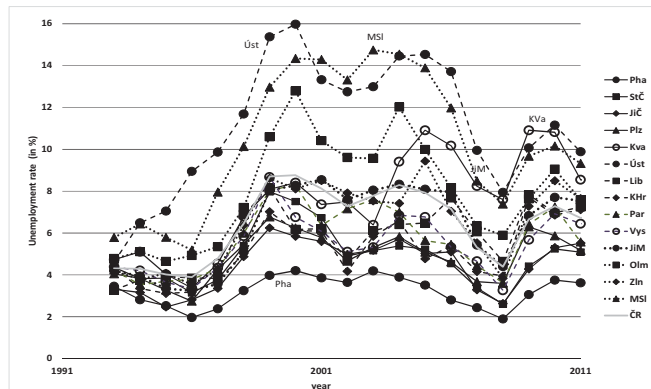
Source: Authors based on Czech Statistical Office

3.2 *Comparison of the Composition of the Population by the Education Level in Capital City of Prague and Karlovy Vary Region*

Not only the education structure but also the age structure of population has changed during the period investigated. We only the regions with the highest and lowest education level, i.e. Prague and Karlovy Vary Region (Figure 6). Of course the education structure mainly among young people aged 20–34 changed.

Figure 6. The structure of people according to age and education level in Prague and Karlovy Vary Region in years 1991 and 2011
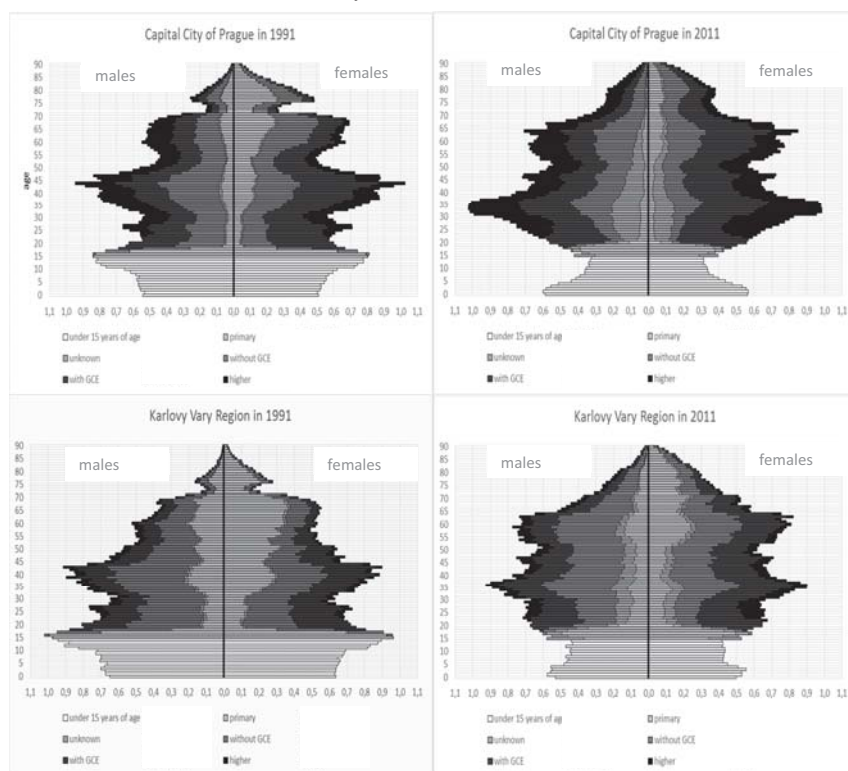
Source: Authors based on Census 1991 and 2011

Another view on the mentioned issue is visible on graphs showing the proportions of the various levels of education at a given age (Figure 7). Here it is possible to observe the effect of the size of the cohort, when people from a stronger year of birth had less chance to get to school. On the other hand, those who were successful, had probably better ability to finish the school successfully. It can be seen, for example, that in 2011 the proportion of people with higher education at the age about 40 (people born about 1970) is less than for the age of about 50 years (born about 1960). The reason for this can be the fact that the number of live births in 1970 was almost 148 thousands, i.e. by 15 % higher than the live births in 1960 (about 129 thousands). A higher proportion of people with higher education in the age 65+ can be explained by the fact that people with higher education have a lower mortality and their life expectancy is longer.

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Source: Authors based on Census 1991 and 2011

3.3 Average Age of Persons Aged 25–64 by Level of Education

An interesting characteristic of the development of the age and education structure of the population can also be the average age of persons aged 25–64 by level of education (Fig. 8). The average age of 25–64 years old for each educational category, can be interpreted as the average age of the potential labor force with given level of education.

The largest increase in the average age of people aged 25–64 years with lower secondary education was in the Zlín Region. There was an increase from the value of 49.3 years in 1991 to 50.7 years in 2011, which was the highest value among all regions in that year. The lowest value in 2011 was in Prague Region (46.6 years).

The average age of people with upper secondary education without direct access to tertiary education increased the most between 1991 and 2011 in the Moravian-Silesian Region. There was in increase from the value of 41.3 years in 1991 to 46.3 years in 2011, it means an increase of 5 years. The highest average age was in Prague (47.1 years), The reason for this increase is due to the fact that more and more young people prefer the upper secondary education with direct access to tertiary education.

Lower secondary education
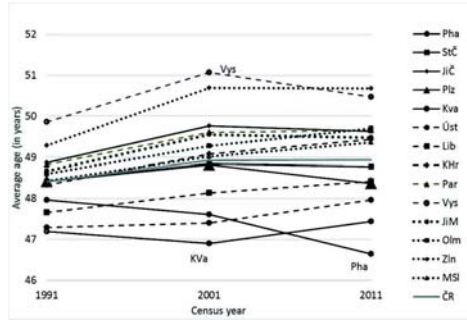
Upper secondary education with direct access to tertiary education
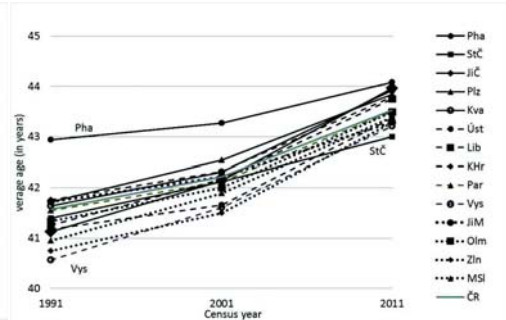
Upper secondary education without direct access to tertiary education
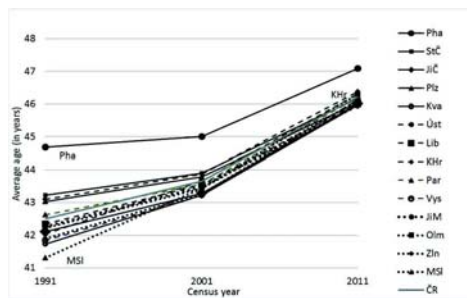
Higher education
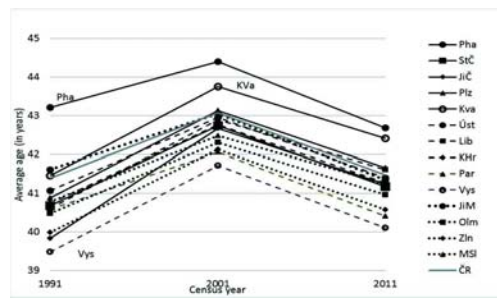
Source: Authors based on Census 1991, 2001 and 2011

The average age of people with upper secondary education with direct access to tertiary education increased the most between 1991 and 2011 in the South Bohemian Region. There was in increase from the value of 41.1 years to 44.0. In 2011 this average age was the highest in Prague (44.1 years) and the lowest in Central Bohemian Region (43.0 years). The increase of the average age is caused by the fact that many young people prefer to reach higher education.

The average age of people aged 25–64 years with higher education grew between the censuses in 1991 and 2011 most in the South Bohemian region and from the value of 39.8 years to 41.2 years. The highest average age was in 2011 in Prague (42.7 years), the lowest in the Vysočina Region (40.1 years). However, while in the last decade of the last century the average age of people with higher education grew, in the first half of this century we see a decline. This is due to the increasing proportion of young people reaching higher education, so even though the average age of the entire population is growing, the average age of people with higher education is decreasing.

4 Conclusion

Only census allows accurate evaluation of populations of regions in terms of age and especially the educational structure. Prague is the region with the oldest population and has the highest proportion of people with higher education and the lowest unemployment rate. The

value of the proportion of people 30 years and older with higher education of all persons in the age group reaches three times the value compared to the region with the lowest proportion. The size of the cohort may also have an impact on the educational structure. In numerous cohorts born in times of baby booms (the seventies of the previous century) the chances of admission to the school could be lower than for the smaller cohorts born in other years, e.g. in the sixties. Regions also differ in terms of the average age of persons aged 25–64 by level of education. In the development of educational structure decreases the proportion of people with no more than lower secondary education and secondary education without direct access to tertiary education. Conversely, the increase in the proportion of people with higher education is higher among women. Educational structure determines the possibilities for development of the region and the living conditions of the region. Educational structure has a significant impact not only on the economy of the region, but also on the demographic behavior of the population. People with higher education have a greater chance to succeed on the labor market, from a demographic point of view have lower fertility and a higher chance to survive to older age.

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Determinants of Hospital Efficiency in the Czech Republic

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Abstract

The paper deals with factors affecting hospital technical efficiency in the Czech Republic between the years 2008 and 2013, namely the existence of differences in average efficiency rate in the distribution according to the type, number of beds and location (Czech regions) of hospitals. Technical efficiency is analysed by means of data envelopment analysis (DEA) method. For each inpatient facility are as inputs used data about the number of beds and average recalculated number of doctors, while the number of hospitalized persons is used as an output value. On the basis of this paper was concluded, that all analysed determinants influenced technical efficiency of Czech hospitals in chosen period.

1 Introduction

Hospital inpatient care is the key part of healthcare system in all developed countries. It is also the part where the biggest healthcare expenditures are spent. There are many factors which affect efficiency of inpatient care facilities. These factors were the topic of many domestic and foreign scientific essays. American authors focus mainly on the role of profit motive and hospital ownership. Application of their conclusions on the Czech healthcare system is quite controversial. But these articles are very useful from the methodological view - especially the choice of methods, outputs, inputs and analysed determinants.

Firstly we can mention American study applying DEA method on chosen sample of American non-profit, state and private hospitals between the years 1987 and 1988. They researched the effect of profit motive. Other subject was the role of fees in producing healthcare services. Researchers thought that, if the clients pay these fees, so the hospital managers will focus more on their demands than on expenditure minimization. Different returns to scale (constant, increasing, decreasing – other kind might fit to other hospital), size of hospital (there is a difference between hospital provided services of big and small hospital) also influence the hospital comparison. Hospitals were separated into groups with similar characteristics to get the homogeneous input sample for analysis [1].

Other paper focused on similar questions. Authors stated based on their analysis that profit hospitals were the least efficient ones in the USA. On the other hand state hospitals were the most efficient. They considered as significant problem making the comparison difficult, that every hospital might have other output (its complexity and quality – unmeasured by DEA method). This might be affected by the size of hospital. Profit hospitals are often specialized for specific healthcare services. In comparison with previous paper the market structure effect was analysed there. It is clear, that there is a difference between hospitals, which are alone in the city and with many competitive hospitals in region. The efficiency of especially profit hospitals might be influenced by memberships in holdings too, because that might cause savings in the supply of necessary goods and services. To get relevant results all the sample of hospitals was divided due to the location, market size, membership in a "professional" group (holding company, holding) and the size of the bed fund [8].

The third American paper tested the hypothesis, that non-profit hospitals are less efficient, because there is usually no direct link between manager's income and economic results of hospital. They pointed out different case mix of each hospital. In this study scientists used the index of technical efficiency (ITE) and regression method on a sample of chosen American

hospitals. To reduce deviations the data were from hospitals in the same state with 100 – 250 beds, focusing only on acute care. Based on this essay, authors considered that the most efficient were non-profit hospitals (similarly state), on contrary were profit hospitals. These outcomes weren't statistically significant. Significant one was only the hospital size. There was stated, that the bigger ones were more average efficient than smaller hospitals. It was concluded that there weren't bigger differences between profit and non-profit hospitals in their technical efficiency [9].

From more actual foreign papers is very important the review article summarising scientific procedure for efficiency analysis in healthcare - selection of appropriate methods, specification of inputs and outputs, drawing conclusions. At the end of this paper is detail description of the knowledge given in 38 chosen scientific essays [12]. We can find also monographies including complex view on efficiency measuring in healthcare [4].

In the Czech Republic some papers were also published. The first one pointed out the advantages and disadvantages of various econometric methods (DEA, FDH, SFA) [2].

In other one the suitable models of efficiency evaluation was discussed. Researchers used DEA method to analyse technical efficiency of 22 Czech hospitals in the year 2003. There is also a detailed comment of results of one hospital and calculated changes in outputs and inputs to reach efficient frontier. At the end they state the opinion, that DEA enables to evaluate hospital efficiency and to find the sources of inefficiency. Authors pointed out the low availability of relevant data for researchers in the Czech Republic, too [3].

The newer paper dealing with efficiency analysis was made by the means of SFA method on sample of 99 hospitals from the Czech Republic between the years 2001 and 2008. The scientists focused on determinants of cost efficiency - hospital size (measured as the number of hospitalized), (non)profitability, the status of a university hospital, the population of the area, where the hospital is located, and the proportion of older people in these areas. The status of a university hospital was evaluated as the main factor of hospital inefficiency. It is reasonable due to specifics of university hospitals – additional expenditures caused by teaching medical students. On the basis of SFA analysis they stated, that from the efficiency view, it is better to have smaller hospitals (to 10 000 hospitalized per year) than bigger ones (more than 20 000 hospitalized). Non-profit hospitals were less efficient than profit ones. More efficient were hospitals located in bigger municipality (bigger competition). Negative impact on efficiency had bigger proportion of older people in chosen area [11].

In follow-up research the authors concentrated on cost efficiency determinants of 81 general hospitals (inpatient care) from 2006 and 2010 (total 395 observations). Operating costs were used as input, as outputs then total number of acute care patients weighted by DRG case-mix index, patients treated at nursing wards and the number of publications (because of the specifics of university hospitals). To get the information, whether efficiency depended on external factors, many dummy variables were used. The authors concluded that non-profit ownership contributed to higher efficiency in large hospitals (over 20 000 hospitalized per year). The reason for this could be increasing participation in research activities. That finding defies common views about the positive impact of privatization in healthcare. Otherwise, it was in the case of small (to 10 000 hospitalized) and medium hospitals (from 10 000 to 20 000 hospitalized), where non-profit ownership and existence of specialized centres were found to be negative [10].

In case of complex analysis of hospital efficiency the following factors should be considered – case mix; (non)profitability; owner (public, private, non-profit); quality of produced output; the structure and size of bed fund; market structure, in which the hospital operates; hospital location (monopolistic, oligopolistic market structures); the structure of the population and the factors effecting health; type of inpatient facility; the number of other medical facilities in the area of monitored organization (eg. different kinds of specialized therapeutic institutes).

It is clear, that it is impossible to construct a model involving all mentioned determinants. In the Czech Republic it is hard to get information about hospital case mix and there is

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uncertainty about hospital owner due to hospitals – stock companies, which may be established by regions or municipalities.

There aren't also enough entities (hospitals) available for analysis based on applying all determinants while maintaining meaningful conclusions (hospitals from the same area, occurring in the municipality with a similar number of hospitals and produced services, etc.).

Differences of hospitals in the Czech Republic can be analysed divided according to the type, number of beds and location. In the paper are tested the following hypotheses:

- university hospitals are less efficient than other types of hospitals,
- large hospitals (inpatient facilities with more than 1000 beds) are more efficient than small (up to 100 beds),
- average hospital efficiency is the same in all regions of the Czech Republic.

2 Material and Methods

The paper uses data published by the Institute of Health Information and Statistics of the Czech Republic (ÚZIS ČR), namely the publication *Zdravotnictví kraje* (Health Care in Statistical Data) and *Lůžková péče* (Inpatient care).

The technical efficiency was analysed by the means of data envelopment analysis (DEA). This method is applied frequently in healthcare, because it enables to work with multiple inputs and outputs without the necessity to know the valuation in monetary units. One of the condition of getting meaningful results is homogeneity of analysed file. The model might be output oriented, where the outputs are maximized with given inputs, or input oriented, where inputs are minimized to create the output. Another criterion for classification of DEA models is the type of returns to the scale of analysed production function. The model with constant returns to scale is called CCR (which is the abbreviation of names - Charnes, Cooper, Rhodes). Later was presented BCC model (the abbreviation of names - Banker, Charnes, Cooper), that assumes variable returns to scale. This model marks more units as efficient [7].

The presented analysis doesn't examine each year separately. The reason is to achieve the greatest possible homogeneity of units in the sample and maintenance of a sufficient number of studied subjects. The goal is to determine how the efficiency developed between the years 2008 and 2013 and not in individual years. The same technology level throughout the time period is used as a simplifying assumption. Measures of efficiency were determined by using EMS (Efficiency Measurement System). The model has a convex structure, the radial distance, and it is not a superefficiency model.

Hypotheses set out in the introduction will be accepted or rejected on the basis of allocation of units into groups and evaluation of their average DEA coefficients by:

- the type of hospital,
- the size of bed fund (the number of beds),
- region where the facility is located.

For each inpatient facility are used as the inputs the information about the number of beds to 31 December of a given year and the average recalculated number of doctors. The number of hospitalized persons is used as an output value.

Table 1 summarizes the distribution of analysed file. According to the type of hospital most hospitals are in the group of acute care hospitals. The deployment of hospitals in the region is uneven, differences can also be observed in the analysis based on the size of hospital bed fund. The analysis is performed on totals (ignores the division of beds to acute and subsequent care) [6].

This model monitoring 983 hospitals represents 86 % of the total potential number (1138) [5]. This sample covers 100 % of university hospitals, 83 % acute care hospitals and 99 % of hospitals of subsequent care. The differences may be caused by closing hospitals during the year and hospital management disagreements with data presentation in the above mentioned publications.

From the perspective of healthcare system the input oriented models are very important, because we cannot assume large changes in output due to healthcare demand, which is nearly unchanged. Different situation might be in the case of specialized medical interventions. The demanded amount of them may also reflect the development of medical technologies. In terms of management decisions it is easier to think about changes in input rather than output. In addition, the choice of hospital output is affected by other key players in the healthcare market in the Czech Republic - health insurance companies and their contracting policy.

Table 1. Distribution of analysed file

Type		Location				Number of beds	
	Number	Region	Number	Region	Number		Number
University hospitals	64	PHA	159	HRA	39	Under 100	223
Acute care hospitals	740	STC	128	PAR	32	100 - 299	395
Hospitals of subsequent care	179	JHC	54	VYS	34	300 - 499	189
		PLZ	65	JHM	129	500 - 999	113
		KAR	30	OLO	48	1000 +	63
		UST	85	ZLI	52		
		LIB	48	MSK	80		
Total	**983**	**Total**		**983**		**Total**	**983**

Source: Author

3 Results and Discussion

3.1 Type of Hospital

The first distribution criterion is the type of hospital. The aim was to verify, whether university hospitals are less efficient than other hospital types. The idea is based on the assumption that the lower efficiency of university hospitals is due to educational processes and specialized medical services. The following table summarizes the results. Based on them the hypothesis was in all possible combinations of model orientations and returns to scale clearly rejected.

Table 2. The Average Rate of Efficiency in the Distribution by Type of Hospital (in %)

	Returns to scale	
	CCR	BCC
	Input oriented model	
University hospitals	82,8336	86,5878
Acute care hospitals	22,5905	61,8751
Hospitals of subsequent care	29,5831	44,7155
	CCR	BCC
	Output oriented model	
University hospitals	82,8331	86,8160
Acute care hospitals	22,4454	66,8898
Hospitals of subsequent care	29,5833	49,8881

Source: Author

Tables 2 and 3 show that university hospitals were the most efficient. In the case of model based on inputs, output was produced very efficiently (over 90 %) in hospitals Na Bulovce and Motol, less (around 70 %) in Hradec Králové hospital. Production function had in the case of the Military University Hospital Prague (ÚVN) character of variable returns to scale - was on the efficiency frontier. Vice versa with constant returns to scale acquired a value of around 80 %.

The technical efficiency of hospital Na Bulovce, Motol and ÚVN indicates also model oriented on outcomes.

The situation was different at hospitals of subsequent care, which were very inefficient. The reason for this can be elected output that is not very suitable for long term care due to longer treatment period. However, there is an organization that was in all models on efficiency frontier or nearby it - Neurologie, s.r.o., Jiřetín pod Jedlovou. It should be noted, that this finding does not say anything about efficiency in practice, this hospital is "only" the best among the other hospitals of subsequent care.

In the case of acute care hospitals there are big differences between the model with variable and constant returns to scale, which may be due to the fact that the nature of their production function is better suited to variable returns. It proves the claim that in the case of a model with production function with variable returns to scale more units are marked to be efficient. The lower value of the indicator may be caused by a large number of analysed units and thus inhomogeneity.

Table 3. The Average Rate of Efficiency of University Hospitals (in %)

	Returns to scale		Returns to scale	
	CCR	BCC	CCR	BCC
	Input oriented model		Output oriented model	
Všeobecná fakultní nemocnice v Praze	88,6083	93,3967	88,6082	94,8070
Fakultní nemocnice v Motole	91,8217	97,2283	91,8240	97,7778
Fakultní nemocnice Královské Vinohrady	80,8850	85,3450	80,8847	82,8307
Fakultní nemocnice Plzeň	77,0817	78,1583	77,0801	81,4428
Fakultní nemocnice Hradec Králové	67,8700	70,7583	67,8693	68,4097
Fakultní nemocnice Brno	83,1983	83,3533	83,1986	93,0013
Fakultní nemocnice U sv. Anny, Brno	69,4200	77,5283	69,4197	72,5412
Fakultní nemocnice Olomouc	84,3850	86,1267	84,3851	85,3874
Fakultní nemocnice Ostrava	87,5350	89,7700	87,5338	89,1848
ÚVN - Vojenská fakultní nemocnice Praha	82,1100	100,0000	82,1054	100,0000
Fakultní Thomayerova nemocnice	89,7100	93,9000	89,7073	92,2363
Fakultní nemocnice Na Bulovce	98,3650	99,0075	98,3651	98,7465

Source: Author

The comparison shows clearly that the production function of all types of hospitals is characterized by rather variable returns to scale. University hospitals significantly better use chosen inputs to create output than other hospitals.

Based on this analysis we can say that one of the major determinants of technical efficiency of healthcare facilities in the Czech Republic is hospital type.

3.2 Hospital Location

Achieved values of average efficiency of Prague hospitals were among the lower values and didn't differ from other Czech regions, even though the healthcare system in Prague is deemed to be specific. In the case of Prague hospitals with more university hospitals the average rate of efficiency significantly increased while using model with variable returns to scale with input and output orientation. A similar development of returns to scale is even more apparent in the average efficiency of hospitals in Hradec Králové region (HRA) and South Moravia region (JHM).

Table 4 shows in all possible combinations of model orientations and returns to scale, that hospitals in Karlovy Vary region (KAR), Olomouc region (OLO) and Liberec region (LIB) had very positive values. The analysed model conversely described as quite inefficient hospitals located in Usti region (UST) and South Moravia (JHM). Hypothetical conformity was in all Czech regions

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rejected. Table 4 also shows that the efficiency of hospital depends on its location. It would be interesting to monitor the influence of selected socioeconomic factors on hospital efficiency.

Table 4. The Average Rate of Efficiency in the Distribution according to Location (in %)

| Region | Returns to scale | | Region | Returns to scale | |
| | CCR | BCC | | CCR | BCC |
	Input oriented model			Output oriented model	
PHA	37,1861	62,7260	PHA	37,1859	59,0337
STC	54,2620	74,7666	STC	54,2619	68,5537
JHC	76,1526	88,3661	JHC	76,1518	83,8844
PLZ	68,2960	84,2815	PLZ	68,2962	79,8678
KAR	80,2013	87,5667	KAR	80,2016	88,5001
UST	47,6546	59,1166	UST	47,6544	53,2963
LIB	81,0475	94,7817	LIB	81,0481	93,1350
HRA	27,4246	84,6454	HRA	27,4246	89,0302
PAR	64,3494	89,0159	PAR	64,3495	77,8262
VYS	78,3712	90,3521	VYS	78,3709	91,1085
JHM	22,8085	61,4486	JHM	22,8084	66,8887
OLO	71,9675	87,4792	OLO	71,9684	89,0280
ZLI	63,4542	79,6412	ZLI	63,4548	77,4279
MSK	77,8693	85,7621	MSK	77,8692	87,1590

Source: Author

3.3 Number of Beds (Hospital Size)

The last hypothesis that large hospitals are more efficient than small hospitals is the only one which was accepted. The idea is based on the assumption of possible savings in the production of health services on a large scale. As it has been already mentioned, a significant role play the cases treated in health facilities. This might be associated with hospital size. There is no doubt that major regional hospital or university hospital will have a similar structure of cases and so it may be among the smallest hospitals that will provide only basic health services.

Table 5. The Average Rate of Efficiency in the Distribution according to Number of Beds (in %)

| | Returns to scale | |
| | CCR | BCC |
	Input oriented model	
Under 100	17,7887	44,4887
100 - 299	51,7829	74,0814
300 - 499	78,7546	87,4687
500 - 999	78,7806	84,5805
1000 +	85,2346	88,6979
	CCR	BCC
	Output oriented model	
Under 100	17,7884	32,7573
100 - 299	51,8718	58,6050
300 - 499	78,7542	82,4632
500 - 999	78,7805	83,2582
1000 +	85,2350	88,4527

Source: Author

On the basis of all possible combinations of returns to scale and orientation of the model can be clearly noted that small hospitals were from all size groups at least average efficient.

However, healthcare system needs to ensure the availability of basic medical services to all residents, regardless of additional expenditures for the system. Moving performances to larger facilities, although it might bring an increase in technical efficiency of the Czech healthcare system, would reduce the comfort of patients and their relatives, which cannot be underestimated, since it strongly influences the success of treatment. On the other hand it appears that specialized medical interventions should be centralized.

Finally, it is possible to conclude that the hospital size significantly affects its efficiency.

4 Conclusion

The efficiency of healthcare system could be increased by clear determination, which activities are carried out in which type of hospital. That closely relates to the influence of other monitored variables - location and size of the bed fund. Undoubtedly, it is possible to say that all three monitored determinants influence the efficiency of hospitals. The hypotheses about lower efficiency of university hospitals in comparison with other types of hospitals and about the same efficient of hospitals throughout the country were rejected. Only in the case of monitoring differences in the efficiency of large and small hospitals was proved that large hospitals are on average more efficient and thus, this hypothesis was accepted.

On the base of data envelopment analysis is possible to calculate the changes that could contribute to an increase in hospital technical efficiency. Nevertheless, it is necessary to draw attention to the weakness of this method, as it cannot take into account demographic changes which play a significant role in decisions about public health expenditures. A possible solution will be the inclusion of selected demographic indicators reported by the Czech Statistical Office into analysis.

In further research will be essential to monitor the impact of case mix of each hospital and for the analysis to use data about the structure of the bed fund published annually by ÚZIS ČR. Interesting variables for efficiency analysis are also: owner (non-profitable, profitable), the quality of produced output, market structure (competition on the market) and demographical indicators.

DEA analysis can be done again in separate years in the future to see how efficiency develops over time. There is also opportunity to compare conclusions with the results of the analysis carried out by other method (eg. FDH).

Acknowledgements

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Participatory Budgeting as an Innovation in Local Public Services Delivery: The Slovak Case

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Abstract

The marketization of public services brings among other objectives also an increase in public expenditure efficiency, improvements in public services quality and co-creation in public services provision. In this article we analyze participatory budgeting that can be perceived as an innovative tool for an effective management of public services delivery. Participatory budgeting enables better allocation of public sources according to citizen´s needs. By involving the citizens in decision making concerning the local government´s spending, the participatory budgeting also enables co-creation of the public services and helps to increase the quality of public services. The goal of this article is to analyze the participatory budgeting in Slovakia whether it is a tool for increasing effectiveness and efficiency of public services delivery as well as tool for increase of citizen involvement at the local level. Main findings, obtained through qualitative analysis, point out that participatory budgeting enables better allocation of public sources according to citizen´s needs.

1   Introduction

A major feature of the New Public Management (NPM) is the introduction of market type mechanisms to the running of public service organizations: the marketization of the public service [7, 10]. Among other goals, it aims also on the plurality system of ownership forms in public service delivering - public-private-civil sector mix, partnerships, cooperation and co-creation in public service delivery [5, 11, 12]. As Bailey [3] stated, the basic principle of such approach is determined by two basic questions: how to produce public services and how to pay for them. The NPM reform suggests solutions for these questions through cooperation with different stakeholders, e.g. firms, non-governmental organizations and citizens [8, 10, 18, 19, 22]. One of such solution can be so called co-creation. It is an innovation in the production process of public services that is open and end-users (citizens) are actively involved in the design and development of goods and services. Outcomes of co-creation are higher effectiveness and efficiency, increase in citizen involvement, increase in customer satisfaction, strengthening of social cohesion and democratization of public services [20]. A good impulse for co-creation might be participatory budgeting.

1.1   Participatory Budgeting

Participatory budgeting (PB) has been one of the most successful participatory instruments of the past 25 years [17]. It was introduced for the first time in Porto Alegre in Brazil in 1989. The new method of public funding management resulted from the experiences of many years of military dictatorship which decreased people's trust in politicians and budgetary spending was associated with money-wasting and corruption. The starting point was a discussion on the previous budget implementation and the priorities for the next financial plan. The key part of these meetings was electing delegates from 16 neighborhoods in Porto Alegre for district plenary assemblies where the proposals submitted by the representatives of each neighborhood were evaluated. Proposals with highest evaluation were implemented as projects

by citizens themselves [9]. Nowadays, PB is becoming more and more popular in Europe as well. It is being introduced by local governments in many countries, such as the United Kingdom, France, Germany, Italy and Spain [21]. Municipalities include large cities (Seville), individual city districts (London, Paris, Berlin, Rome), medium-sized towns and small municipalities. Many of them prepare their own models of PB, adjusted to the local conditions. They differ mostly in the size of the budget allocated for the process [17]. In 6 years it has been spread even more, some authors [6, 21] claim that participatory budgeting is being used in nearly 3 000 municipalities.

The essence of participatory budgeting can be defined as a mechanism through which the population decides on the destination of all or part of the available public resources on the local level [9]. Participation gives local authorities a possibility to gain useful knowledge about the community's needs so they can make informed and more accurate decisions. On the other hand, it allows residents to participate in planning local public spending. To do this, they identify the most urgent spending needs, make their own proposals and take a bigger role in controlling public spending.

Several authors [1, 2, 4, 15, 16] have agreed on these principles of successful PB:

- Grassroots democracy – citizens' assemblies determine priorities and elect delegates and representatives who follow up on the development of suggestions put forward.
- Social justice – funds which are at the disposal of each of the areas are distributed among the districts, taking into consideration the number of residents and the quality of the infrastructure available, as well as the local list of priorities.
- Citizen control – this principle is realized by means of boards (e.g. Council of the Participatory Budget), which convenes once a week. Its members are elected during the basic assemblies. It is their duty to ensure that the priorities of the districts are taken up in the budget to the largest extent possible. Usually an independent NGO active in the municipality trains the representatives of the participatory budget in order to enable them to co-plan with the administration.

These three principles led to a real empowerment of civil society and the success of PB is achieved due to a combination of a strong and pragmatic political will on the part of the local government on the one hand, and of bottom-up mobilization on the other side [14].

There are many models of creating a participatory budget, with respect to our research, these models are needed to be briefly defined:

- *Porto Alegre adapted for Europe* - discussions in neighborhood and/or thematic assemblies open for anybody interested, primarily deal with concrete projects and their prioritization, citizens influence methodology and have decision-making competence, i.e. strong civil society;
- *Representation of organized interests* builds on traditional local arrangements in social and/or economic sectors discussion of broad political guidelines, depends on participation of local associations, local government is a central actor. Discussions deal with general priorities and strategic planning. Position of civil society is weak to medium as other actors are involved;
- *Community funds at local and city level* - there is a fund for projects in the social, environmental and cultural areas. The fund is not created only from local government budget but money come also from companies or other organizations. Priorities are discussed by community groups with some hints of deliberation, businesses are excluded. Community groups are formed by citizens, including specific groups (e.g. ethnic minorities), i.e. civil society has rather strong position;
- *The public/private negotiating table* – in this model there is also a fund created. At closed meetings involving businesses, local authority, NGOs and citizens, priorities of projects are discussed. Citizens and NGOs have a secondary role and a weak position;
- *Consultation on public finances* – this model can be seen as a participative version of New Public Management strategies. Meetings are usually open to all citizens but there is no cycle (often only one meeting/year) and no prioritization of projects.

Topics of discussion are evaluation of public services and institutions or budget balancing. Citizens have only consultative influence, their position is rather weak;

- *Proximity participation* – participants do not vote or develop priorities for projects. Meetings are open to anyone but companies, discussions deal with investments in the neighborhood and concrete projects without prioritization. Civil society has weak position [17].

As we can see, the models of PB in Europe varies but every model enables citizens to participate in passing the budget of the local government either directly or in mediated way by various representatives (NGOs, community groups).

Participatory budgeting can be seen as a tool for an effective management of public services provision, in our analysis we try to answer following research questions:

- How does PB influence the effectiveness of public services provision?
- How does participatory budgeting influence the efficiency of public services provision?
- How does participatory budgeting increase the citizen involvement?

We believe that other types of co-creation outcomes (customer satisfaction, trust in public authorities, social cohesion etc.) can be achieved through PB. Moreover, participatory budgeting can improve the relationship marketing of the municipality [13]. Due to the limitations such as short period of using the PB in selected country and lack of information from citizen side, we focus only on those outcomes in research questions that can be supported or disproved in our analysis.

2 Material and Methods

The goal of this article is to analyze the participatory budgeting in Slovakia whether it is a tool for increasing effectiveness and efficiency of public services delivery as well as tool for increase of citizen involvement at the local level. We analyzed three towns (of which one uses PB in three local districts) that implemented participatory budgeting in Slovakia. We gathered data from municipality websites, press and official reports relating to the participatory budgeting. We have also used personal experience of one of the authors who actively participated in implementing of PB in the town of Banská Bystrica. Regarding the outcomes of PB we have analyzed to what extent it has been beneficial by comparing the press releases and reports including citizens' reactions with official municipality and/or NGO reports about the participatory budgeting. To analyze data on PB we used a framework that is illustrated in the following figure 1. The analytical framework is based on models defined by [17].

Figure 1. Analytical framework for case studies

DIMENSION	•STUDIED CRITERIA
Organisation of meetings	• Neighbourhood and/or thematic assemblies • Closed vs. public meetings • Regularity (cycle vs. one or two meetings)
Type of deliberation	• Topics of discussion • Prioritisation of topics/projects • Formal vs. informal discussions
Position of civil society	• Kind of civil society (includes or not the business organisations) • Type of participating citizens (social sectors, organised citizens, active citizens, ordinary citizens, all citizens) • autonomy of civil society (meetings of civil society with or without administration/councillor)
Initiators of PB adaptation	• top-down dynamics (municipality initiated PB procedure) • bottom-up dynamics (citizens or NGOs initiated PB pocedure)
Amount of budget	• amount of public finance assigned to PB
Number of participants	• active participants (attending meetings and deliberation) • other participants (on-line voters)
Number of submitted projects	• submitted projects for the deliberation
Number of approved projects	• approved projects after the deliberation and town approval
PB model	• indetification of the model used

Source: Authors

3   Results and Discussion

3.1 *Participatory Budgeting In Slovakia*

In Slovakia there are three municipalities that have implemented participatory budgeting so far. The first municipality was the city of Bratislava in 2011, followed in 2013 by the town of Ružomberok and the latest town with PB is Banská Bystrica in 2014. In all three towns, except one district in Bratislava, the process of PB was started by an initiative of local NGO and the work of volunteers. The process can be described as shown in Figure 2:

Figure 2. Process of participatory budgeting in Slovakia
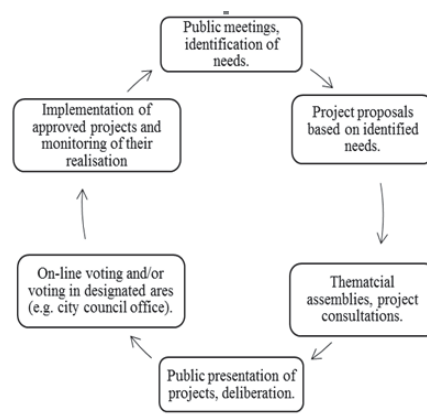
Source: Authors

There are only three municipalities with PB in Slovakia so far so it allows us to provide a deeper analysis but for the sake of the presentation we will state only the most important facts for every town, the summary of PB in Slovakia is in Table 1, which follows the analytical framework and contains also information on thematic communities.

The case of Bratislava (BA) was specific that in the first year the money (15,000€) for PB was gained from sponsors, not from the public budget. The PB was implemented in a bottom-up way where active citizens and the NGO Utopia raised the money, established co-operation with the city council and involved other citizens. Approx. 200 citizens participated in 5 thematic communities and for each community there were up to 3 projects selected. The winning projects were approved in a deliberation process and the city council formally decided on spending the money for the proposed projects. In the next year BA City Council allocated 29,975€ from its budget and for 2013 it was 46,000€. Yet, the problem is that the city undertook that the amount for PB would be 1% of total costs which should be around 2 MM. €. This is highly demotivating for volunteers who devoted their free time and work on the projects but lack the funding. The city of BA is challenged by other problems; currently the most serious are publicity of PB (the city does not use its channels to inform the citizens about PB which decreases the number of participating citizens); problems with tranches (delayed tranches for some projects, non-transparent process of drawing money) and the quality of deliberation (NGO strongly prefers public meetings whereas the city wants on-line voting where the deliberation is endangered). These challenges have led to the division of PB in Bratislava to local districts, in 2013 it was Bratislava (BA) and Petržalka (Pet) and in 2014 also Nové mesto (NM). In 2015 BA is facing a difficulties when new mayor changed the rules of PB, renamed it for civic budget but there are no transparent rules of public voting, it seems he just supported four projects that are sort of in public interest (cycling path, greenery). Petržalka has implemented a different model of PB – projects are presented by the municipality in three categories and citizens can only vote which one will be realized in every category. This is the so-called model of Consultation on public finances. Nové mesto adapted Porto Alegre for Europe model, with public deliberation and voting system where votes casted at the deliberation have 50% weight, on-line voting has 20% weight and voting at 11 designated points has 30% weight. So far this municipality seems to be the most successful, the amount allocated for PB nearly tripled in 2015 compared to previous year, number of participants increased from 768 to 2,440.

In Ružomberok the PB process started in 2013 based on the initiative of the NGO Tvorivý Rozvoj in co-operation with the experienced NGO Utopia which helped to implement and establish PB in Bratislava. In the first year, two thematic communities were created where citizens met and discussed the ideas on the improvement of municipal services and environment. Out of 7 submitted projects, 6 were approved in the election which consists of public deliberation and on-line voting. As the initiators of PB in Ružomberok aim to increase citizens' participation in public life, the votes given to the projects after the deliberation process have weight of 90 per cent and on-line voting has 10 per cent. This is to motivate citizens to come to the public forum for the deliberation process and increase active citizenship. Projects can be submitted only by citizens who actively meet during the year at the thematic assemblies. Anybody with permanent residence, over the age of 18 can vote. Projects are then ordered by the number of votes and those supported are those which gain most of the votes up to the project when amount for PB is all drawn. These projects are officially approved by the town council. So far, the initiators, town deputies and public servants, nor the citizens have encountered any serious obstacles or problems. The challenge is to increase the number of projects and to increase amount of money allocated for PB in Ružomberok. For Ružomberok there are no data available in 2015 although various webpages inform on PB in 2015

Banská Bystrica (BB) used PB for the first time in 2014. The initiators were the NGO Via Altera in cooperation with NGO Utopia and one deputy from local government. This is worth of notice as there were local elections in Slovakia in November 2014 and the step of supporting PB might have been aimed at getting some extra votes. Despite the deputy support, which enabled a smooth passing of PB in the town council, there was a serious problem in the pilot year. The money allocated for PB was taken from so-called civic councils. These councils were assigned

1.5€ per citizen living in the district of each council from collected local taxes (there are 11 civic councils for 11 districts in BB). In 2014 it was only 1.25€ per citizen and the rest of the amount (0.25€*77,820 citizens) was assigned to PB. This minor drop in funding for civic councils has evoked a big wave of disagreement. The members of civic councils complained that they were elected for deciding how to spend public money in their districts and they wanted to disrupt the process of PB. Their protests stopped when they found out they can also apply with the projects, this time as regular citizens, not as elected bodies. Indeed, 2 out of 4 approved projects were submitted by citizens from these civic councils. Despite the problem, PB continues in 2015 with the amount of 19,343 €. The PB process is very similar as in Ružomberok but with three differences. All citizens over the age of 15 with permanent residence in BB are eligible to vote, which increases also participation of young people. Secondly, not only citizens who actively participate in thematic assemblies can submit a project, project submission is open to all citizens over the age of 18 with permanent residence. The third difference is that in BB there is no on-line voting. Citizens can vote either at the public forum after the deliberation process or in the town hall by casting their votes after checking their residency at the clients' zone. In the town hall it is possible to vote for one project only and that vote has a value of 1 point. At the public forum those citizens who participated in the deliberation process can vote for three projects and based on their priorities they can assign 5 points to the project they like the most, 3 points to the second and 1 point to the third project. The intention is not only to involve the public in the creation of the public budget and to raise their interest in and understanding of the town financial mechanism but also to choose such projects that really matter.

In all three municipalities, the areas for PB were similar, e.g. Youth, Seniors, Culture, Public spaces and urbanism, Opendata, Social care, Health, Active citizenship and community life. Some of the main outcomes were: creation of community gardens, turning unused places into community centers, parks revitalizations, playgrounds reconstruction, senior helpline, (Bratislava); turning unused ski jump into a memorial, public spaces revitalizations, public bike rent, planting of greenery (Ružomberok); revitalization of community center, sport areal and town park, organizing of sports day and "cultural summer" (Banská Bystrica).

As we can see in Table 1 the thematic communities are from the fields of public services, i.e. all projects involve citizens as co-creators of public services. Citizens create the projects based on their needs and priorities and in the deliberation process they choose the winning projects to be implemented. Moreover, following these positive examples other municipalities in Slovakia are preparing to start PB, e.g. Šaľa which approved 5,000 € in April 2015 for the first year of participatory budget, or towns of Brezno and Zvolen that are planning to start from 2016.

Table 1. Analyzed cases of participatory budgeting in Slovakia

Year	Bratislava					Ružomberok		Banská Bystrica	
	2011	2012	2013	2014	2015	2013	2014	2014	2015
Organization of the meetings	Public meetings, thematic assemblies, neighborhood assemblies (BA, NM), 1 public meeting (Pet)					Public meetings, thematic assemblies		Public meetings, thematic assemblies	
Type of deliberation	Open discussion forums, at least one open discussion with public deliberation (BA, NM) Topics of discussion: PB procedure, projects None (Pet)					Open discussion for whole town. Topics of discussion: PB procedure, projects – priorities and criteria, at least one open discussion with public deliberation		Open discussion for whole town. Topics of discussion: PB procedure, projects – priorities and criteria, at least one open discussion with public deliberation	
Position of civil society	All citizens older than 18 can take part in PB procedure. Business organizations, NGO and organized citizens cannot present proposals as such but only as private entities, i.e. as citizens. (BA, NM) All citizens older than 18 can take part in the voting and choose one projects from three areas proposed by local government (Pet)					All residents older than 18 can take part in PB procedure. Business organizations, NGO and organized citizens cannot present proposals as such but only as private entities, i.e. as citizens.		All residents older than 15 can vote, residents older than 18 can present projects proposals. Business organizations, NGO and organized citizens cannot present proposals as such but only as private entities, i.e. as citizens.	
Initiators of PB adaptation	Bottom-up dynamics – NGOs initiated PB procedure (BA, NM) Top-down dynamics – local authorities initiated PB procedure (Pet)					Bottom-up dynamics (NGOs initiated PB procedure)		Bottom-up dynamics (NGOs initiated PB procedure)	
Participatory budget in €	15,000 € (not from the city budget)	29,975 € (0,01% of total town budget)	46,000 € (BA) 31,096 € (Pet)	46,000 € (BA) 15,000 € (NM) 41,620 € (Pet)	40,000 € (BA) 40,000€ (NM) N/A for Pet	5,000 € (0,03% of total town budget)	4,500 € (0,02% of total town budget)	19,455 € (0,04% of total town budget)	19,343 € (0,04% of total town budget)
Number of participants	200	250 + 1911 on-line voters	400+3,063 on-line voters (BA) N/A for (NM) 400+1,033 on-line voters (Pet)	N/A for BA 176+592 on-line voters (NM) 1,674 both present and on-line voters (Pet)	N/A for BA 1,011+1,429 on-line voters (NM) N/A for Pet	N/A	N/A	205 at the deliberation public forum+177 at the clients' zone of town council	112 at the deliberation public forum+400 at the clients' zone of town council
Number of projects	13	16	14 (BA) 10 (Pet)	28 (BA) 15 (NM) 10 (Pet)	N/A for BA 18 (NM) N/A for Pet	7	N/A	31	17
Number of approved projects	7	8	4 (BA) 3 (Pet)	7 (BA) 11 (NM) 3 (Pet)	4 (BA) 10 (NM) N/A for Pet	6	3	4+2*	5
PB model	Porto Alegre for Europe		Porto Alegre for Europe (BA, NM) Consultation on public finances (Pet)			Porto Alegre for Europe		Porto Alegre for Europe	

*At first there were only 4 projects approved but the ideas of two projects which were first and second under the line were supported from the Town Council (additional funding from public budget).

Source: Authors

4 Conclusion

Comparing participatory budgeting in municipalities in Slovakia, we can see that the "Porto Alegre adapted for Europe" model prevails in order to strengthen active citizenship and direct democracy, except the case of Petržalka where citizens only vote for projects that the municipality district suggests. Based on the results of 4 years it might be a preliminary conclusion to say that PB increases the level of co-creation in public services but we can observe these effects (table 2) following the research questions we put in the introduction.

Table 2. Schematic display of participatory budgeting effects

Effectiveness	Either missing public services are provided or provision of those public services is realized that citizens themselves want to strengthen, i.e. citizens' needs are addressed in a better, more effective way.
Efficiency	Public services are provided in the least expensive way in term of public finance (volunteer work which is hard to measure and express in financial value, not to mention know how of participants who write and submit project proposals).
Citizen involvement	Civic participation is increased. By involving the citizens as co-designers their needs are taken into consideration, as volunteers the citizens play a crucial role in the realization of the projects and in co-creation process as such. Citizens are also involved in a passive manner, if they do not propose and/or realize the project, they can decide as voters

Source: Authors

With particular focus on innovation in public administration we analyzed how PB can contribute to co-creation in public services. The discussion indicates that PB can be seen as a tool for increasing citizens' participation. Participatory budgeting allows implementation of projects proposed by citizens, elected by citizens and realized by citizens themselves. The latter also means that a big amount of volunteer work is used in the realization of the projects which has a positive impact on public finance. By proposing the projects citizens also learn about public finance – how taxes are redistributed, what laws and regulations needs to be kept when handling public finance etc. and also how to create a budget. PB has also proven to have this educational aspect. Citizens understand more the redistribution mechanism and they demand bigger transparency in local public finance. Therefore the best model to be used is the "Porto Alegre for Europe" which contains all educational aspects and enables higher participation, public debates and deliberation, increases direct democracy. Form the Slovak towns, the best example to be followed is the local district of Nové Mesto which is the most successful in the implementation of PB.

To sum it up, participatory budgeting enables better allocation of public sources according to citizen´s needs, citizens vote for projects that provide such public service they feel themselves to be important. On the whole, participatory budgeting can be seen as an innovative tool for an effective management of public services provision following a new trend of public co-creation.

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Approaches to the Assessment of Research and Development in EU Countries

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Abstract

This paper deals with approaches to the assessment of Research and Development (R&D) in the countries of the European Union. Results of the research introduce the assessment of R&D in the EU (27) countries, on the basis of the indicator of R&D results (the number of publications in R&D per 1,000 inhabitants, and the number of publications per FTE researcher from the government and the higher education sector), and the indicator of human resources in R&D (research in the public sector per 1,000 active persons) in 2012, using cluster analysis and correlation analysis. By means of cluster analysis, EU countries were divided into four clusters, where the most significant differences were observed in the mean value of the number of publications in R&D per 1,000 inhabitants, as opposed to the least significant differences, which were observed in the mean value of researchers in the public sector per 1,000 active persons among all clusters. The results of the correlation analysis in EU countries confirmed a moderate correlation in the number of publications in R&D per 1,000 inhabitants, and the number of publications per FTE researcher in the government and the higher education sector.

Keywords: assessment; indicators; publications; research and development; researchers

JEL Classification: O32, O39

1 Introduction

Science, research, development and innovations are one of the numerous sources of economic growth and social welfare. Currently, what mainly dominates the development of economies and societies is knowledge connected with research and development outputs. Science, research and development possess a significant place in areas of national economies and in the public sector. One method of assessing R&D in the public sector is measuring its effectiveness. In this sector, the 3E method, Economy, Efficiency, Effectiveness, is adequate to be utilised. The essence of effectiveness is the input: output ratio [2, 14]. R&D involves a whole host of activities, which can be divided into a number of purposes and criteria. Among the most frequently used perspectives of division are: where research is carried out, who is the target beneficiary, and who provides the financing. When evaluating R&D, what needs to be considered is not only the total volume of resources and development of a given country, but also their structure and sources of financing. R&D assessment also needs to consider the perspective of research activity of the type of research. R&D can be divided into three basic areas: basic research, applied research and experimental development [9, 17]. Oriented basic research and general applied research are at times referred to as target-oriented research, or strategic research.

R&D is assessed by means of a variety of statistics, such as OECD, EUROSTAT or NABS methodology. The most recognised is the OECD statistic, which evaluates R&D in member states with more than 100 defined indicators [13]. This mainly concerns indicators of HR, outcome, innovations, international cooperation and R&D financing. Indicators related to R&D financing include, for instance, Gross domestic expenditure on research and development (GERD), expenditure in the business enterprise sector (BERD), expenditure in the government sector (GOVERD), the higher education sector (HERD), and the private non-profit sector. International

comparison mostly measures total expenditure on R&D (GERD) towards GDP. This financial relation is called "research and development intensity" and belongs to the group of elementary structural indicators evaluating the progress of Lisbon-treaty objective-fulfilments in individual EU countries [18]. One of the EU financial indicators is Government budget appropriations or outlays for R&D (GBAORD). It is another valuable indicator that measures government support for R&D using data from budgets. This essentially involves identifying all budget items which include R&D and measuring or estimating their R&D content in terms of funding. These estimates are less accurate than performance-based data but as they are derived from the budget, they can be linked to policy through classification by objectives. Trends in R&D, and relations between R&D expenditure and other indicators in EU countries are supplied by research and studies already carried out [3, 13, 17].

To evaluate R&D inputs and outputs, key indicators have to be defined, serving as an adequate criterion. This fact is also supported by other studies dealing with R&D evaluation in EU countries [1, 2, 4, 10, 16]. Key R&D indicators are considered to belong in the area of human resources, for instance the number of researchers, the share of women, university educated individuals. According to [17] R&D staff are regarded to be research workers who carry out research, as well as technical, administrative and other R&D workers. R&D employees are observed via two basic indicators. The registered number of employees includes all R&D staff regardless of the full-time equivalent. The indicator of the average registered number of staff calculated to the FTE devoted to research defines the real time devoted to activities related to R&D by research staff. Research workers are the most important group of employees in R&D. The most frequently used indicator for international comparison of human resources in R&D is the number of research workers per 1,000 employees [17, 18]. Various pieces of research deal with the issue of human resources and researchers in individual countries, e.g. [12]. Indicators on R&D are, for instance, the number of publications per 1,000 inhabitants, the level of citations from academic papers by subjects [% of the global average], number of EPO patent applications per one million inhabitants. As the OECD [13] states, the number of publications connected to researchers' FTE in R&D is an approximate indicator of the effectiveness of research activities. That is because the number of publications is not indicative of the quality of published results, unlike the number of citations. The number of references to published papers, however, demonstrates the importance, significance and relevance of the content for current research [7]. Citations can also indicate the impact authors have on the scientific scene [5]. Other authors e.g. [19] argue that assessment focused on one aspect of research (i.e. the volume of publications and their citations) leads to a shift in objectives of research workers, resulting in a large amount of short reports, or artificial citations.

Based on a theoretical-empirical approach, this paper aims to evaluate the position of R&D in EU (27) countries, using selected indicators. It focuses on indicators of R&D results (the number of publications in R&D per 1,000 inhabitants, and the number of publications per FTE researcher from the government and the higher education sector), and the indicator of human resources in R&D (research in the public sector per 1,000 active persons), using cluster and correlation analysis. Internal similarity and difference in selected R&D indicators is observed and followed by the verification of the existence of any correlation between R&D indicators in the individual EU (27) countries and this cluster as a whole.

The paper is composed of four sections. The introduction deals with the position of R&D and its assessment possibilities and approaches. Second section lists the utilised methods and methodology, including data sources and the selected set. Third section presents the results of the R&D assessment, according to the selected indicators in EU (27) countries, including discussion. The conclusion provides a summary of the main results and a theme for further research.

2 Material and Methods

This paper uses statistical data from Eurostat and from the analysis of R&D and innovations in the Czech Republic, and their comparison with other countries [6, 18]. The selection comprises 27 deliberately chosen EU countries (BE-Belgium, BG-Bulgaria, CZ-Czech Republic, DK-Denmark, DE-Germany, EE-Estonia, IE-Ireland, EL-Greece, ES-Spain, FR-France, IT-Italy, CY-Cyprus, LV-Latvia, LT-Lithuania, LU-Luxembourg, HU-Hungary, MT-Malta, NL-Netherlands, AT-Austria, PL-Poland, PT-Portugal, RO-Romania, SI-Slovenia, SK-Slovakia, FI-Finland, SE-Sweden, UK-United Kingdom). Year 2012 was chosen due to the availability of data from all countries.

For the sake of comparison of EU(27) member states according to R&D indicators (the number of publications in R&D per 1,000 inhabitants, the number of publications per FTE researcher in the government and the higher education sector, research in the public sector per 1,000 active persons), cluster analysis was used. Cluster analysis represents a multi-dimensional statistical method used for a classification of objects. It enables dividing observed units (EU27 countries in this case) into groups of similar units with other groups differing to the largest extent. For the purposes of this case study, the method of hierarchical cluster analysis was used, due to the low number of cases. Its advantage lies in graphic depiction of the process of clustering see [8], i.e. EU member states according to R&D indicators. Thus, hierarchical tree diagram (i.e. dendrogram) is widely applied for depiction of final distances between objects. The horizontal line of the dendrogram expresses distance between clusters. Clusters unite based on the shortest distance, measured either with the Euclidean distance, or another, using any method of counting distance, such as average linkage, single linkage and complete linkage. The vertical line can determine the required extent of object clustering. As Ward's method was implemented to perform hierarchical cluster analysis, it was supposed to employ squared Euclidean distances as the initial distance between objects [8], i.e. the EU member states in this case. The advantage of Ward's method is its tendency to create clusters of small size to minimise building of clusters with one object only (ibid). Box plot was employed as a method of graphical visualization of differences in the variance of R&D indicators by groups of the EU member states. Box plot, as one type of diagram, divides continuous variables into quartiles, when 25% of elements have values below the lower quartile *Q0.25*, and 75% of elements have values lower than the upper quartile *Q0.75.* The middle "box" part of the diagram borders the 3rd quartile from the top, 1st quartile from the bottom, and between those is a line delimiting the *mean*. Size of the box is represented by the interquartile range. The lower whisker represents the values below the box, within the distance not exceeding 1.5-fold height of the box. End of the whisker corresponds with the lowest value of the cluster. Similarly, upper whisker corresponds with the highest value of the cluster. Besides whiskers (below and above them), points that correspond to outlays are depicted [15].

Kolmogorov-Smirnov test proved standard distribution of all original variables. However, both the performed box plot and detrended Q-Q (Q – quantile) probability plot showed the significant outlier in the variable number of publications per FTE researcher in the government and the higher education sector, represented by Cyprus in this case. Thus, the box plot exhibited the position of this value more than 3-times of interquartile range, i.e. above the 75th percentile, and the detrended Q-Q probability plot displayed the value of deviation from normality higher than 1. Hence, values of all variables were transformed employing natural logarithm (Ln) to eliminate influence of the outlier in performing both hierarchical cluster analysis and correlation analysis. Values adjusted into more detail by natural logarithm are stated in Table 1.

Table 1. Selected R&D indicators in EU member states in 2012

EU country	Number of publications in R&D per 1,000 inhabitants	Number of publications per FTE researcher in the public sector	Researchers in the public sector per 1000 active persons	EU country	Number of publications in R&D per 1,000 inhabitants	Number of publications per FTE researcher in the public sector	Researchers in the public sector per 1,000 active persons
BE	0,53	−0.78	1.97	LU	0.29	−1.35	2.00
BG	−1.24	−1.71	1.34	HU	−0.51	−1.35	1.60
CZ	−0.08	−1.14	1.75	MT	−0.78	−1.39	1.47
DK	0.92	−0.99	2.28	NL	0.72	−0.45	1.33
DE	0.15	−1.27	2.01	AT	0.41	−1.08	2.11
EE	0.07	−1.14	2.16	PL	−0.62	−1.11	1.57
IE	0.43	−0.78	1.65	PT	0.09	−1.43	1.40
EL	−0.08	−0.69	2.14	RO	−1.17	−0.89	1.78
ES	0.10	−0.94	1.83	SI	0.55	−0.92	1.98
FR	0.04	−1.31	1.55	SK	−0.60	−1.66	2.11
IT	−0.09	−0.65	1.37	FI	0.68	−1.31	2.41
CY	0.04	−0.03	1.26	SE	0.84	−0.80	2.29
LV	−0.49	−1.51	1.90	UK	0.48	−0.97	2.30
LT	−1.39	−2.04	2.37				

Source: Authors

Another R&D indicator observed in the EU countries used in the cluster analysis was *correlation*. An important parameter is correlation coefficient (r), which measures the strength (proximity) of positive correlation of both variables. It reaches values ranging <−1, 1>, where positive and negative values define positive and negative correlations, and absolute value defines the strength of the positive correlation. The closer the proximity to the absolute value of 1 is, the stronger a correlation is regarded. The strength of positive correlation is defined by the determination coefficient (r^2 the correlation coefficient *r* squared, expressed in percentage). Determination coefficient also shows how appropriate a model is. It states the part of *Y* variability that the model can explain. The calculations in the following part are the output of the SPSS Statistics 21.0 software.

3 Results and Discussion

3.1 Results of the Assessment of Selected R&D Indicators in EU Countries by Means of cCuster Analysis

R&D in EU countries was assessed via cluster analysis on the basis of the indicator of R&D results (the number of publications in R&D per 1,000 inhabitants, and the number of publications per FTE researcher from the government and the higher education sector), and the indicator of human resources in R&D (research in the public sector per 1,000 active persons). The cluster analysis enabled dividing the EU countries in question into four clusters by their internal similarity. Results of the EU27 clusters are shown in Figure 1.

Figure 1. Dendrogram of the selected R&D indicators in EU countries
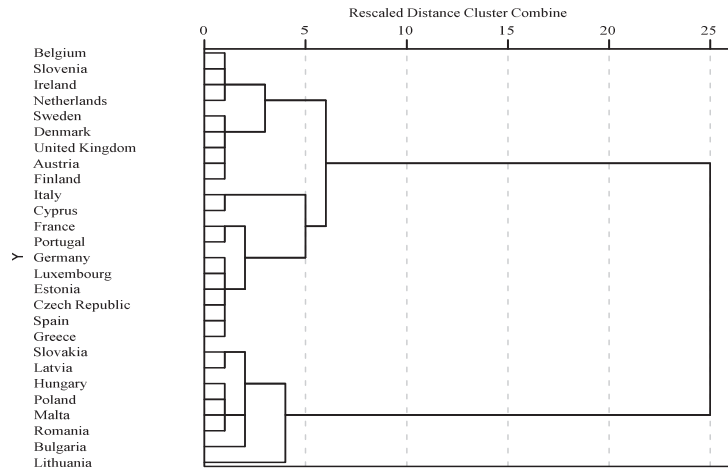
Source: Authors

The explanation of EU member states division into the above-mentioned groups reflects on GDP per capita of the countries, focus on their national R&D policies, their extent of expenditures on and investments in R&D. Cluster (1) comprises Ireland, Netherlands, Belgium, Finland, Slovenia, United Kingdom, Austria, Sweden, Denmark. These are mainly countries characterised by larger spending on the public sector and R&D. Cluster (2) consists of two countries, Italy and Cyprus, with a high performance of R&D mainly in the number of published papers. Cluster (3) includes France, Portugal, Czech Republic, Spain, Germany, Luxembourg, Greece and Estonia. It is a group of countries which, with some exceptions, provide high government subsidies on R&D, which enables developing trends in national R&D policies. Cluster (4) consists of Lithuania, Slovakia, Latvia, Romania, Bulgaria, Malta, Hungary, Poland. These are countries from the Eastern bloc and Baltic states that entered the EU in 2004 and 2007. They are characterised by low spending on R&D and national policies influenced by the European Research Area (ERA).

Results of cluster analysis of the EU(27) are also presented graphically by means of the values of natural logarithm exploiting a box plot (see Figure 2). Figure 2 shows that EU(27) constitutes largest discrepancies in the mean values in the number of publications in R&D per 1,000 inhabitants (in Cluster 1 and cluster 4). As regards cluster 1, the largest number of publications in R&D per 1,000 inhabitants is observed in Denmark, and the lowest in Austria. In cluster 4, the highest number of publications in R&D per 1,000 inhabitants is observed in Latvia, the lowest in Lithuania. Other differences were observed in the mean values in the number of publications per FTE researcher in the government and the higher education sector in Clusters 2 and 4. Cluster 4 demonstrates the highest number of publications per FTE researcher in Romania, the lowest in Lithuania. Cluster 2, comprising Italy and Cyprus, shows that the number of publications per FTE researcher is higher in Cyprus. However, these countries reach better results in the number of publications per one FTE researcher, by a third, in comparison with the highest values in countries from cluster 4. By contrast, the smallest differences between the individual clusters were observed in the mean values in the number of researchers in the public sector per 1,000 active persons, with the exception of cluster 2. Also, a large dispersion of the

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number of researchers in the individual clusters of EU(27) countries is apparent. Outliers in Cluster 1 are observed in the Netherlands, owing to low values of researchers in the public sector in comparison to other countries in the cluster. However, as analyses of R&D in EU countries reveal, researchers in the public sector include researchers from the government sector and the higher education sector. [4, 11].

Figure 2. Box plot – results of the assessment of R&D indicators in EU countries
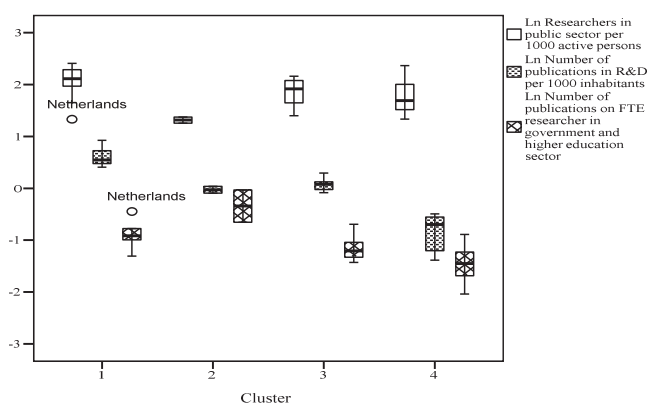
Source: Authors

The number of researchers is imbalanced in the public sector, since the number of researchers in the higher education sector is in the majority of countries as much as three times higher in comparison to the government sector. This can be partially explained by the structure of the higher education sector, which comprises staff from public and state universities, teaching hospitals and private universities. According to comparative analyses, the strongest position of the higher education sector in terms of the public R&D in EU countries is present in Denmark, Malta, Ireland and Sweden. By contrast, in most EU countries (entering the EU in 2004 or later, with the exception of the Baltic states), the government sector plays a more dominant role, mainly due to its strong position of institutions similar to the type of the Academy of Science (e.g. in Poland or Hungary), or owing to low expenditure on R&D in the higher education sector (Bulgaria, Romania) [13, 17, 18].

3.2 Results of the Assessment of Selected R&D Indicators in EU Countries by Means of Correlation Analysis

Another R&D indicator observed in the EU(27) countries used in the cluster analysis was correlation. Figures 3, 4, 5 demonstrate correlations of the individual R&D indicators on the basis of the four clusters. Figure 3 proved a moderate linear correlation in the number of publications in R&D per 1,000 inhabitants, and the number of publications per FTE researcher in the government and the higher education sector ($r = 0.539$, $r^2 = 0.290$, = 29%). The defined correlation is that the higher the number of publications in R&D per 1,000 inhabitants is, the higher the number of publications per FTE researcher in the government and the higher education sector.

Figure 3. Correlation between the number of publications in R&D per 1,000 inhabitants and the number of publications per FTE researcher
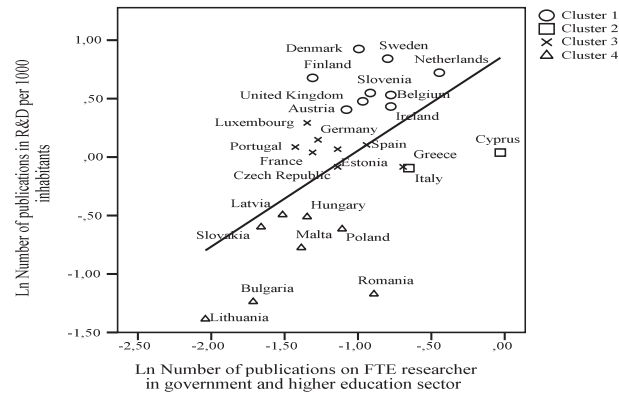
Source: Authors

A weak negative correlation was observed between the number of researchers in the public sector per 1,000 active persons and the number of publications per FTE researcher in the government and the higher education sector ($r = -0.254$, $r^2 = 0.0645$, = 6.5%). Figure 4 reveals the Netherlands and the both members of the second cluster, i.e. Cyprus and Italy, as the EU members with the highest performance in relation to the number of pieces of research in the public sector per 1,000 active persons and the number of publications per FTE researcher in the government and the higher education sector. By contrast, a low effectiveness was observed in Lithuania, which, with a large volume of research in the public sector per 1,000 active persons, manifests a small number of publications per FTE researcher in the public sector (the government and the higher education sector). Also in the case of researchers in the public sector per 1,000 active persons and the number of publications in R&D per 1,000 inhabitants in EU27 was proved a weak positive correlation, when $r = 0.272$ and $r^2 = 0.07398$, = 7.4%. Figure 5 manifests an apparent effective correlation in the Netherlands (Cluster 1), which demonstrates a large number of publications with a small number of pieces of research in the public sector, similarly to countries of Cluster 2 (Cyprus and Italy). Conversely, Lithuania demonstrates a non-effective correlation, where a high number of pieces of research in the public sector correspond with very low results in the number of publications.

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Figure 4. Correlation between the number of researchers and the number of publications in R&D
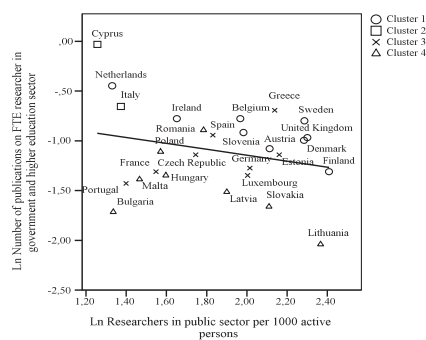
Source: Authors

Figure 5. Correlation between the number of researchers and the number of publications per FTE researcher
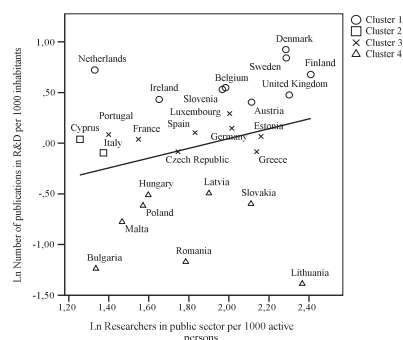
Source: Authors

Another perspective can be provided when assessing the expenditure on R&D (in % of GDP) in EU countries. As [6] state, the highest level of total expenditure on R&D is observed in Scandinavian countries (Finland 3.3% GDP, Sweden 3.2% GDP, Denmark 3.0% GDP) and Germany 2.9% GDP. By contrast, the lowest level of total expenditure on R&D is observed in Romania 0.39% GDP, Cyprus 0.48% GDP, and Bulgaria 0.65% GDP.

4 Conclusion

EU initiatives and individual countries have been paying increased attention to research conditions, and research and development over the past decade, due to the fact that R&D plays a key role in the generation of new knowledge, products and technological processes. R&D can be approached and evaluated from numerous perspectives and by numerous criteria. Among the most frequent assessment criteria is the way of conducting R&D, research outcomes, who provides financing, or the area of research or science research activity. One method of assessing R&D is measuring its effectiveness. The present research deals with the R&D assessment of 27 countries of the European Union, evaluated by selected criteria and employing cluster analysis. It confirmed that the most marked differences are present in all EU clusters in the numbers of publications in R&D per 1,000 inhabitants, as opposed to the number of researchers in the public sector per 1,000 active persons, where the smallest differences were observed in the individual clusters of EU(27) countries. The results of the correlation analysis in EU countries confirmed a moderate correlation merely in the number of publications in R&D per 1,000 inhabitants, and the number of publications per FTE researcher in the government and the higher education sector. The results also revealed that the Netherlands and both members of the second cluster, Cyprus and Italy, reach the highest performance in relation to the number of pieces of research in the public sector per 1,000 active persons, and the number of published persons per FTE researcher in the public sector. R&D in EU countries and approaches to its assessment constitute an extensive area of interest, which also provides room for other scientific methods, e.g. regression analysis or analysis of variance (ANOVA). In relation to the assessment of R&D indicators, a whole host of questions remain unanswered, which could serve as a theme for further specific research.

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Communication Media in the Aspect of Competitive Intelligence of Selected University - Research of Pardubice University

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Abstract

This paper is focused on the analysis of communication methods, with the aim to utilize the rate of individual communication media of selected stakeholder groups (applicants of researched University). The constituent part of this article is an example of benchmarking of the most frequent communication tools, websites and social networks. The major source is based on individual phases of a processing cycle, such as management of data collection, processing, and data analysis. The aim is to simplify University fast orientation in rapidly growing marketing communication and stabilize the competitive position. Data is taken from a questionnaire among students. The method of competitive intelligence is utilized on this data as a result of the research. These results could be applied for targeting within marketing of other universities. The paper should bring some new view on what communication channels are stakeholders using within the area of education in universities.

Keywords: marketing; competitive intelligence; university

JEL Classification: I21, I25, M31

1 Introduction

Universities are trying to direct themselves and therefore gradually get involved in individual managing approaches. In order to succeed, it is necessary to have strategic management and a stable relationship with all involved parties (stakeholders), as reported in [11, 12]. Ho and Hung in their publication [8] suggest setting up a suitable marketing mix and strategy for tertiary education institutions based on market segmentation. In their own research they specify 5 major groups of University candidates, for whom they define suitable marketing strategies [9]. Susniene and Purvinis [17] are devoted to the issue of stakeholder analysis (detailed distinction of interests and needs). As reported in Soukalova [16], Universities (further Universities only) are focused on individually targeted groups with their main aim to strengthen the overall image of School, through higher volume of provided information in regard to differentiation among all competitors.

While observing University management practices, it is clear, that many authors are concerned about suitable marketing strategy in the area of University education. Their focus is devoted to strategic marketing and pointing out importance of planning in marketing [6, 13]. Authors who are involved in future marketing are emphasising the importance of integration of strategic planning [15] and advertising, with the aim to incorporate marketing communication and give a successful reputation to the University. Highly regarded authors are pointing out the importance of connection of all forms of marketing communication in a single process. It is reported that the marketing communication approach is enhancing efficiency based on synergy [7, 18]. This approach is similar to a business sector approach which shows the fact that knowledge of identical and non-conforming factors for individual segments of consumers allows them to focus and to choose an effective marketing tool, especially in advertising and promotion. This leads to the reduction of the costs for these activities. All these activities are usually dependent on financial analysis in a region [5]. The less money in the region the less possibility to create any marketing strategy; this doesn't apply only to universities.

Communication is an integral part of the comprehensive approach of university's target audience which should be clear from information mentioned above. However, we don't know if communication media has crucial influence on the final decision of candidates when choosing the university. This is the reason why we tried to identify the crucial channels of communication. We also tried to propose inclusion of acquired knowledge into comprehensive university access, by using Competitive Intelligence [10] methods with benchmark comparison of competitive universities. The entire effort aims to facilitate fast orientation of a university in the changing environment of marketing communication and consolidation of its competitive position.

In a 2013 pilot survey, the authors of this article were devoted to the issue of selecting particular content of the notice, which was targeted on a carefully chosen group of stakeholders – such as University applicants. In 2014 the main purpose was to show how the University is able to segment the market of potential students and prepare a very preciously contented promotional notice in order to efficiently target selected groups.

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2 Material and Methods

2.1 Questionnaire

The main purpose of this article was to find out utilization rates of media communication within a selected group of stakeholders. The questionnaire has been used in order to provide sufficient data and secure their processing. The whole project was implemented by the University of Pardubice – Faculty of Economics and Administration (FES UPa) during the academic Year 2014/2015.

To avoid inaccurate answers during the survey, all the questions were closed with the exception of one. The questionnaire was divided into 3 separate parts:

- Factors playing a major part in University selection; respondents were asked to select the power of influence during their decision making.
- Media were without doubt the most commonly used source during their decision process; applicants were able to choose more than one answer without having to select the strength of influence in their decision making.
- Last part of questionnaire was focused on identification/personal details of applicants.

Questions were addressed to students of Year 1 of the present Bachelor studies during winter and summer semester within 2 subjects. There were 488 students asked to complete the questionnaire. The rate of return was approximately 72% (71% of them were female and 29% male respondents). Further ID of all respondents was adjusted.

During processing of the answers, there wasn't significant sign of dependency on individual characteristics of respondents, which would have had any kind of influence. It wasn't necessary to divide students into separate groups and judge them individually.

We found from results obtained by questionnaires, that the most usable communication media are electronic ones. We decided to compare these electronic channels of the researched university with its competitors. Sophisticated market access was evident during monitoring of universities' behaviour, especially with both the volume and pressure of competitors rapidly growing. Due to high complexity and sophistication of newly utilized ways of accessing, Universities are trying to resolve the problem in order to make the information system more secure, which should lead to smooth and complex data processing, and their efficient application in marketing focus on targeted groups. Apart from that it also leads to utilization of Competitive Intelligence (competitive coverage, further CI). CI is an interdisciplinary specialization, and one of the Business Intelligence disciplines. It is the systematic and ethic process of data collecting, analysing and using the information, which can influence the intention of the organisation and their function. CI is also used as a system of decision making support [1]. Therefore, we propose to analyse the success of the communication's channels and to ensure continuity with the other instruments of the marketing mix. We also propose to show the advantage of incorporation of the individual steps within the context of the whole competitive intelligence concept, as described below.

This paper focuses on helping the university to consolidate their competitive position through the appropriate selection of communication channels. Based on the version of Francois Jacobiac [3], benchmarking is the method of comparing competitors, which is very useful within the competitors market [2, 14]. For this particular purpose, the Faculty of Economic and Administration, University of Pardubice, was compared with the Faculty of Management and Informatics at Hradec Kralove University (FIM UHK) and other similar faculties as a direct competitor in terms of location and specialty.

During benchmarking, every single type of information could play a vital role. Simultaneous comparison of competitors is considered as a tactical tool, rather than a strategic weapon. It logically implies that permanent monitoring is the key. That involves setting of a similar information system, as competitive Intelligence requires. On the other hand, benchmarking does not allow society to predict any opportunities and threats coming from its environment. And therefore it is convenient to combine comparison with other methods of Competitive Intelligence, such as competitive analysis, which allows the getting of a general overview [3].

3 Results and Discussion

3.1 Intelligence Analysis of information Obtained

Authors of this article were devoted to the issue of selecting particular content of the notice, which has been targeted on a carefully chosen group of stakeholders – such as University applicants in the 2013 pilot survey. In 2014, the main purpose was to show how the University is able to segment the market of potential students and prepare a very preciously contented promotional notice in order to efficiently target selected groups.

One of the questions from this survey is built on previous research and is trying to find out what impact the selected factors has had on University choice. During the survey it has been confirmed that assurance of a potential career ladder had the most influence, followed by distance of commuting together with level of funding. For our respondents, the difficulty of admission process and chance of obtaining work based experience, played the significant role.

Media Used by University Applicants

Current research has distinctly started to focus on media and sources of information and their impact on the University selection process. Media plays a big role in sharing information. It is very important to choose a correct source of social network, clearly the most popular one among the young people due to the funding costs [4, 8, 16].

During the analysis of 'media used for survey and collecting information' on available Universities, it was found that the most useful media is clearly the internet (95% respondents), followed by 49% respondents using catalogues and only 12% using newspapers and magazines during their research. This fact shows how importantly a University needs to focus on sources being published on the internet. At same time it shows the fact, that the press still plays vital role among the media; especially in the form of supporting materials which are distributed across High Schools, exhibitions, or simply made available at University open days (45% of respondents have used both internet and printed materials).

As mentioned above the internet played the key role in media usage. Therefore it is important to find out which other sources, apart from www sites of the University, were students mostly using and focus on. From the research made at UPa (see fig. 1.) it is clear, that the most exploited engine used is 'Where to go after High School graduation' (www.kampomaturite.cz) with 41% (mostly used by students from Grammar Schools and Business Schools), Summary of Universities – MSMT (Ministry of Education, Youth and Sports) 33% (preferred by students from other High Schools). Other sources showed very similar utilization rates with a total value of 22%. From all answers given, it is clear that the Scio websites are rarely used among all respondents and there is no sign of students using the website of national comparative sample testing.

Figure 1. The most used electronic sources among the University applicants
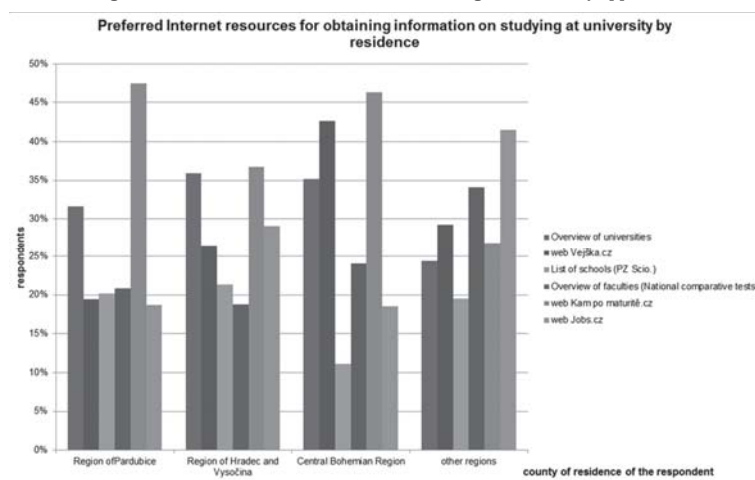
The most common Internet sources to obtain information about University education based on locality

This corresponds to the fact that prestige of the University didn't have a major effect on respondents. The above information can be useful in the future for funding purposes (but not

only these) within mentioned internet sources. Continuous monitoring should be assured in order to follow up the development of the applicant survey and long term prognosis within CI.

Influence of Media during Decision Making

Based on research with most influential sources, information obtained through www websites of UPa with 53% votes ended in first place (commonly voted by students from Grammar School), and very closely followed by 47% of respondents who got recommendation from other friends (another group of stakeholders), (stated by students from Business School and other High School). 25% received promotional materials UPa and 23% Open Day (Further OD only). 6% of respondents said Open Day and promotional materials had the same influence on them. Lower impact had: exhibition of Postgraduate studies and lifetime education Gaudeamus - 21%; recommendation from parents or idea: 'I always wanted to study UPa' had only 5% and the least respondents were influenced by an educational consultant, only 1% (see figure 2).

Figure 2. The most influential power in deciding among the University applicants
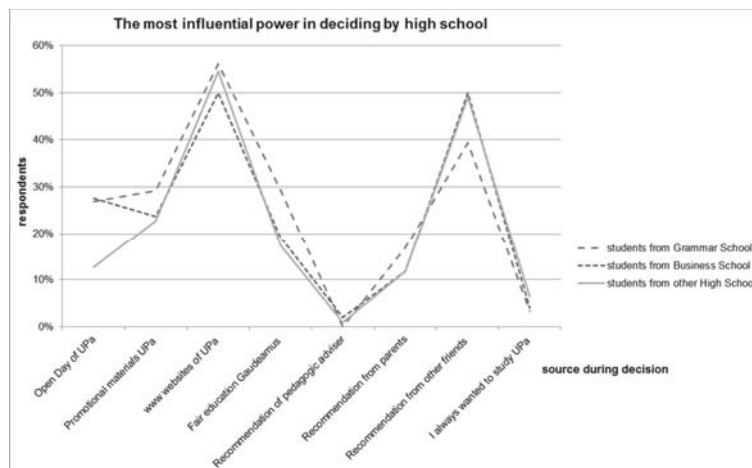
Source: Authors

During more detailed research based on influence of locality, was found that the resident address of the respondent doesn't have significant impact, with exception of respondents who live within easy reach of University. 14% show influence of parents and distance. In general we can say that, the financial situation of the family is taken in consideration. We could see minor differences in friend references, which had a slightly higher impact in a particular area than www websites of University, (which led over friends' references in all other areas).

3.2 Benchmarking Specialized in Electronic Information Resources

The next part of the article is going to focus on utilizing tools of competitive intelligence, particularly internet sources and social networks due to their popularity. For comparison, FES UPa and others similar faculties in Czech Republic have been used.

SEO tool is easily accessible either for feedback purposes or optimization of selected websites for search engines. During analysis of secondary data, it has been found that total force value of a selected University website reached 61% (65% source code) and backlinks leading to the domain FES UPa was 613 254. Website Alexa rank has gained in average popularity [2].

In table 1, we can find results of University comparison optimization done by SEO (March 2015). The table header contains the name of Faculty and evaluation indicators. Strength of website indicates total score in optimization test. The stated percentage value of comprehensive analysis is in the column source code. Other columns Seznam/Google indicate the placement of websites Seznam and Google after entering the first 4 words from the website title. Except for FES UPa and FIM UHK, Faculty websites are all located in first place. A further column indicates the number of backlinks leading to the tested domain, where the utmost values confirm FES UPa. Index Alexa rank reflects website turnout, where the lower value corresponds to bigger popularity among users. It wasn't possible to find out these data for FES UPa. The last monitored index is the age of domain converted to years. It wasn't possible to find out these data for OPF SU [2].

Table 1. Evaluation of optimization of selected Faculties

Name of Faculty	Power of page[%]	Source Code[%]	Seznam / Google	Backlinks	Alexa rank	Age of domain
EKF VŠB-TUO	62	67	1/1	216 189	88 752	18,3
EF JČU	61	72	1/1	10 942	99 907	18,2
EF TUL	61	65	1/1	12 242	158 364	13,8
FES UPa	61	65	1/4	613 254	-	17,2
OPF SU	59	60	1/1	419 162	137 511	-
FEK ZČU	58	70	1/1	42 008	75 844	17,8
FIM UHK	55	45	2/2	415 704	149 940	14,4

Source: Authors based on [2]

Monitoring of Social Media

Most benefits of Social Media for CI are connected with profile monitoring individual faculties of University. For the purpose of monitoring single electronic and communication activities some of the analytic tools which have been used, help to easily understand how competition is behaving on Facebook. It is possible to identify changes made and therefore improve results of Facebook marketing. Particularly for this article, outputs of available tools have been used, which are suitable for competitive Intelligence.

One of the available tools is LikeAlyzer, which enables the testing of web presentation of Faculty websites on Facebook. It generally rates profiles and highlights strengths/weaknesses. It also monitors the popularity of interaction as well as response time of users. Another available tool is AgoraPulse Barometer, which calculates the average per-cent rate for several criteria based on the last 50 contributions. Due to that, it is possible to compare data as viral and organic search of (not only) fans, amount of clicks, sharing of uploaded content and other statistics. CScore is tool used for analysis of Facebook pages and it is free of charge. This tool indicates the criteria which is key in decision making in terms of success and popularity of the pages. It focuses on the relation between inserted contribution and fans reaction time as well as viral content from the perspective of quantity and quality of answers, score and popularity of web pages etc.

Currently the total profile score of FES UPa on Facebook using the search engine LikeAlyzer is 53% to the date 03/2015, the monthly increase of 'Like' is 2,26%, and amount of contribution per day is 1,78 which puts the University in first place.

Table 2 shows score of individual profile web pages of selected University Faculties on Facebook through LikeAlyzer. In the table header, the name of the Faculty is stated followed by testing indicators. The first indicator shows total percentage of website score.

Table 2. Comparison of Faculty profile evaluation on Facebook via LikeAlyzer

Name of Faculty	Total evaluation [%]	Like amount	Monthly increase likes [%]	Amount of contribution per day	Timing of contribution	Length of contribution
FIM UHK	83	2 598	1,60	1,07	0	1
OPF SU	62	2 631	-1,20	1,55	0	0
EKF VŠB-TUO	58	2 068	1,12	0,84	1	1
EF TUL	56	1 641	-0,60	0,52	0	1
FES UPa	53	1 039	2.26	1,78	0	1
FEK ZČU	43	722	0,65	0,68	0	0
EF JČU	38	2 004	0,50	0,64	1	0

Source: Authors based on [2]

4 Conclusion

The paper describes research study aimed at identifying the communication channels that are used by a selected stakeholders group in an examined university. Especially we describe the communication channels that have greatest influence for the decision of university choice by the applicants.

The authors of the paper set an aim to identify communication channels that have an impact on decision-making of applicants that want to study at the university with the intention to find ways how to facilitate increasing university competitiveness to help select the most appropriate media for communicating with applicants. This aim was carried out successfully.

The first step was the preparation and realization of research between the university students. Based on the questionnaire investigation we identified factors that most affect the respondents in their choice of university, and the media which has been most used for university choice.

Given the fact that the most commonly used medium and the medium with the highest degree of influence on the final decision was web sites (53%), the authors also focused on exploring these pages within the comparison of competing universities in the form of benchmarking with the use of SEO tools. It was found that the examined university is in a slightly better position within the context of the benchmarking.

The authors also examined the competitive position of the Facebook profile which was not included in the survey due to the fact that Facebook profile was not used in the time when respondents were deciding on their university. It was found out that the examined university received an overall lower rating in comparison to FB using the LikeAlyzer tool. Significant growth of attractiveness and interest is obvious compared to the competitor during March 2015. This type of information may indicate a degree of success of individual activities on social network for the University.

More detailed examination of the data obtained by questioning brought these findings: overview of the schools on the site of Scio and the "Overview of the faculties provided for the national comparative tests" are almost never used by the respondents in contradistinction to the most used sources of information "where to go after graduation" (Kam po maturitě - service) (41%). It is also interesting that the educational adviser was identified as a source of information only by 1% of respondents. The results obtained were subsequently also tracked by distance of the place of residence of the respondents from the university, and by the type of

secondary school which they studied. This research has yielded interesting information, useful to the University for better targeting of potential students.

The final recommendations of the authors is to incorporate the above work with the data in the various phases of the intelligence cycle such as controlled data collection, processing and intelligence analysis of obtained data. This information can be used within competitive intelligence. This recommendation is based on research that has found, that universities have a growing need for a more sophisticated approach to the market.

For further research, it could be interesting to focus on other tools to analyse the electronic media, which is missing in this paper. It is possible to compare their contribution in the context of the competitive intelligence of the universities, which can be useful for other business entities.

Another important communication channel influencing the decision-making of university candidates are friends. There is also an interesting possibility for the analysis of this group of stakeholders, which may be a separate research question for further examination.

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Region to Region Comparison of Selected Social Services for Senior Citizens

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Abstract

This contribution deals with the topic of certain social services provided on the level of and by the Czech Republic (CR) administrative regions. This contribution is focused senior citizens (elderly) target group. The objective of a background study executed for the purpose of this contribution was to identify how social services for this target group had developed with time. The objective is also to show what the mid-term tendencies in this services sector in connection with democratic developments towards population ageing are. Relevant data was acquired from Regional information service (RIS) and from the Ministry of Labour and Social Affairs of the CR (MPSV CR). The acquired relevant data covers the period from year 2008 to year 2013. Despite the finding that total expenditures disbursed for the mapped services grew in absolute amounts, in relative amounts it was not so and for some mapped indicators we even witnessed the decline. This is the case for instance with the indicator "number of homes for the elderly per 100 000 inhabitants" or the indicator "number of places in homes for the elderly per 100 000 inhabitants". In this contribution we present also a comparison of regions regarding the selected mapped indicators. The comparison is done with the use of cluster analysis. With regard to the trend of population ageing it is obvious that to meet the needs of seniors shall, in the future, consume increasing portions of the public budgets.

1   Introduction

In the CR social services are administered by the MPSV CR. This Ministry budget expenditure exceeds 500 billion CZK (in year 2013 it was 512 billion CZK). The total amount of expenditures paid by this Ministry to finance social services provided under par. 34 of Act 108/2006 Coll., that is the social services discussed in this contribution, reached 23.5 billion CZK in year 2013 [12]. With regard to the expected demographic development in our country and with regard to the population ageing it is anticipated that there shall be increasing problems to provide and to finance all required services for our citizens in need. The objective of this article is to illustrate the development of the number of selected social services for senior citizens with regard to the increasing number of senior citizens in the individual CR regions. This article should thus contribute to the description of the existing situation in this area and to contribute to looking for possible solution of this situation. This area has recently been engaged in many soures [3, 9, 13].

From the demographic point of view changes in age structure are the result of general civilization development. This development is linked to changes in reproduction behaviours that are translated into birth rate and mortality rate, but also in other demographic processes. Based on some forecasts the CR, in the half of the 21st century, can have, together with Italy and Greece, the highest share of senior citizens in the world. In the coming sixty years the CR will see major changes in the demographic structure of its population. These changes shall be caused by the continuing trend of population ageing that is existing due to longer life expectancy combined with low birth rate. According to the CZSO data people over 65 years of age may represent in year 2030 22.8% of the entire population, in year 2050 31.3% which represents about 3 million

people. The number of the most senior inhabitants shall increase in the fastest rate. In year 2050, based on CZSO prognostic data, there shall be about half a million inhabitants of age 85 and higher [9] (according to [14] in year 2014 it was as follows: persons 65 years and older - 1 880 406; 85 years – 35 010; 90 years - 14 637; 95 years – 2 274 and 99 years plus – 1 152 inhabitants). In Fig. 1 there is illustrated the development of the number of inhabitants of age 65 plus. Based on the current situation it is clear that the number of old people growth both in the absolute and in the relative terms. And at the same time the share of children and young people in the population declines. Thus we can talk here about both the absolute and the relative population ageing (an estimate of mortality rate is solved e.g. in [7]). What regards demographic trends in the European Union there is visible the pattern of combination of increasing length of life in combination with extremely low level of birth rate [9].

In connection with the population development there can be expected a major increase in the possibility to live longer in the higher age. Older population shall be on average healthier, but it shall suffer from chronic and degenerative health problems and that shall translate itself into lack of self-sufficiency. This will lead to increasing society costs and to increased health care costs as well as social services costs [9].

Figure 1. Number of inhabitants projection for the CR for age group 65 plus
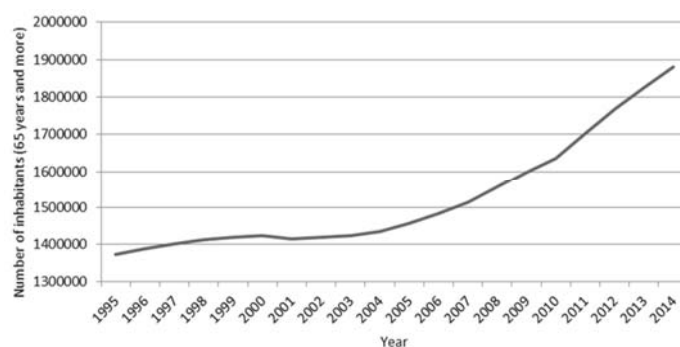
Source: Authors based on [14]

A social service is an activity or a set of activities according to [16] providing for assistance and support to individual persons in order to allow for their social integration or to prevent their social exclusion. In the wider concept social services are provided to people that are socially handicapped with the objective to improve the quality of their lives or to integrate them into society in the maximum extent. Social services take into consideration both the person who uses the services as well as the family of the client person [5, 11]. Social services must be provided with the best intention for the recipient and in the relevant quality so that human rights and fundamental freedoms of the persons are met [5, 16].

Social services have different categories according to the form in which they are provided [16] live-in (stay-in) services, outpatient services and field services. Live-in services are services connected with accommodation in social services facilities. Outpatient services are provided to people who are able to come into social services centres. Accommodation is not provided under this type of service. Field services are provided to a person in his/her natural social environment [5, 16] (e.g. care taker services - the objective of this service is to provide for the basic live needs of the client, to support independent and self-sufficient life of the client in his/her home, to keep in contact with social environment and to prevent, for the maximum length of time, the need to place the client into an live-in social care facility [5, 13].

The following types of facilities are facilities providing services to senior citizens [5] e.g. day care centres (here outpatient services are provided to persons with lower self-sufficiency caused by age, chronic disease or health handicap whose situation requires external assistance by a third person), day stay-in facilities (outpatient services are provided here to patients with lower self-sufficiency due to age or health handicap and to persons with chronic mental health handicap whose situation requires regular assistance by a third person) and week live-in facility (they provide living-in services to people with lower self-sufficiency due to age or health handicap and to persons with chronic mental health handicap whose situation requires regular assistance by a third person), homes for persons with health handicap (facilities providing live-in services to people with lower self-sufficiency due to health handicap whose situation requires regular assistance by a third-party person), retirement homes (live-in facilities providing services to persons with lower self-sufficiency whose situation requires regular assistance by a third party person) and homes with special regime (live-in facilities for persons with lower self-sufficiency due to chronic mental health handicap or due to dependency on addictive substances and for persons with old-age Alzheimer dementia and with other types of dementia who have lower self-sufficiency due to these health problems and whose situation requires regular assistance by a third person. The regime of the provision of these services is tailor-made to the specific needs of these persons [16].

2 Material and Methods

Collection of data can be done from various sources [10]. Here we have used available databases to acquire the data and we have executed an analysis of this data utilizing selected methods. This analysis is focused primarily on social services for seniors.

2.1 Data Collection

The data has been collected from [12, 14] for the period 2008 to 2013 and for the individual 14 regions of the CR. The following indicators (attributes) have been observed focusing primarily on seniors (population of age 65 plus years of age and older): retirement homes, day stay-in facilities and homes with special regime, number of places in retirement homes, number of places in day stay-in facilities, number of places in homes with special regime. Homes with caretaker services have not been observed due to lack of available data (available are only data for years 2008 – 2010). The total number of inhabitants of age 65 plus in the individual CR regions was another important indicator.

In order to be able to compare the acquired data we have created a set $\mathbf{A}$ = { $a_1, a_2, \dots, a_6$ } of derived indicators (attributes, indicators) for years 2008 – 2013 where a_1 is number of retirement homes per 100 000 seniors; a_2 is the number of day stay-in facilities per 100 000 seniors; a_3 is the number of homes (facilities) with special regime per 100 000 seniors; a_4 is the number of places in retirement homes per 100 000 seniors; a_5 is the number of places in day stay-in facilities per 100 000 seniors; a_6 number of places in homes with special regime per 100 000 seniors. The provided data represents time series for the period from year 2008 to year 2013 for individual CR regions.

Simple time series dynamic measures [1] enable to characterize the basic features of "behaviour" of the time series and to formulate certain criteria for their modelling. Among the basic dynamic measures belong the absolute increment and the average absolute increment. The growth coefficient k_T (denominated also as the growth rate) is an important measure of the time serious dynamic, such an important measure is also the average growth rate k_{Aver}, the relative increment δ_T and the average relative increment δ_{Aver}:

$$k_T = \frac{y_T}{y_{T-1}}, \ T = 2,3,...,n \,; \ k_{Aver} = \sqrt[n-1]{\frac{y_n}{y_1}} \,; \ \delta_T = \frac{y_T}{y_{T-1}} - 1; \ \delta_{Aver} = k_{Aver} - 1. \qquad (1)$$

2.2 Data Analysis

The relevant data have been analysed based on the already mentioned time series dynamic [1, 2, 17]. The data have been analysed both from the point of view of the comparison of the mapped indicators for the entire CR and for comparison of the individual regions. The starting point for the analysis is Tab. 1 and the calculations elaborated based on the original data describing the number of inhabitants of age 65 plus and based on the original values of the observed indicators (that is without the re-calculation per 100 000 seniors rate).

Based on the values of the relative increments of the stated indicators calculated from years 2012 and 2013 it can be observed that there exists a more prominent increase in the value of a_3 and a_6, both values inform about the number of homes (facilities) with special regime per 100 000 seniors (a_3 = 6%) and at the same time about the number of re-calculated places in these facilities (a_6 = 9%). Also the indicator a_2 shows and increase by 1%, this indicator represents the number of day stay-in facilities per 100 000 seniors.

Table 1. Selected indicators of dynamic rates a1 , a2 , ..., a6

Rate of Dynamics	Attributes					
	a_1	a_2	a_3	a_4	a_5	a_6
Average growth coefficient (2008 to 2013)	0.99	0.99	1.05	1.05	0.91	1.07
Average relative increment in % (2008 to 2013)	-1%	-1%	5%	- 3%	-9%	7%
Growth coefficient (2012 to 2013)	0.98	1.01	1.06	0.97	0.96	1.09
Relative increment in % (2012 to 2013)	-2%	1%	6%	-3%	-4%	9%

Source: Authors

Despite the fact that in year 2013, compared to year 2012, the number of seniors increased (there were 57 926 seniors more) as well as the number of retirement homes increased (8 more homes than in the previous year), the value of the indicator a_1 showed decline by 0.43. The stated situation represents the decline in the value of indicator a_1 by 2% in year 2013 compared to year 2012. In the observed years 2008 to 2013 this means that the number of retirement homes per 100 000 seniors declined each year on average by 1% and thus the number of re-calculated places in these homes declined by 3% annually. The values of the growth rates calculated from years 2012 and 2013 and the average growth rate for the observed indicators is demonstrated in Tab. 1. The values of indicator a_5 number of places in day live-in facilities per 100000 seniors show also a decline. From the stated information it issues that the number of seniors in the observed years saw on average each year growth by 3.25% while the number of places in day live-in facilities demonstrates on average decline by 6%. The growth rate of indicator a_5 in the individual years is presented in Fig. 2.
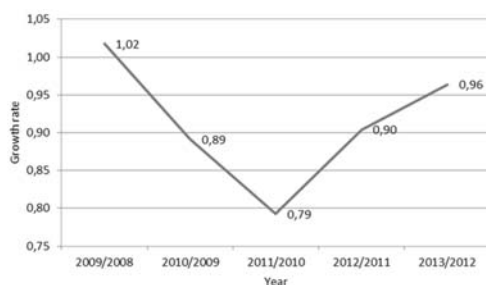
To identify similarities between regions (NUTS 2) on the basis of the observed indicators we can utilize the hierarchical clustering methods (HCM). The HCM could be divided according to the manner that the similarity measure is calculated. Single-link clustering method (also called nearest neighbour method), complete-link clustering method (also called the further neighbour method), average-link method etc. are examples of HCM. The dendrogram is the result of the HCM [8]. It is commonly used to represent the process of hierarchical clustering. It shows how objects are grouped together step by step [4, 18]. A clustering of the data objects is obtained by cutting the dendrogram at the desired similarity level [8].

3 Results and Discussion

In Tab. 2 and 3 we can see the values of indicators showing the development of selected social services in relation to the number of seniors in the region-to-region comparison.

Table 2. Average coefficient of growth from years 2008 to 2013

NUTS 2	a_1	a_2	a_3	a_4	a_5	a_6
Capital city Prague	1.03	1.00	1.25	0.99	0.94	1.14
Středočeský region	0.98	1.02	1.11	0.97	0.95	1.10
Jihočeský region	0.97	1.00	1.04	0.98	0.84	1.04
Plzeňský region	1.02	0.98	1.14	0.98	1.06	1.14
Karlovarský region	0.99	1.01	1.08	0.96	1.11	1.09
Ústecký region	0.95	0.94	1.10	0.94	0.83	1.12
Liberecký region	0.97	1.03	0.96	0.98	1.00	0.97
Královéhradecký region	0.99	1.04	1.05	0.99	1.02	1.08
Pardubický region	1.00	0.93	1.07	0.98	0.86	1.06
Region Vysočina	0.99	1.03	1.02	0.97	0.93	1.03
Jihomoravský region	0.99	0.99	0.99	0.97	0.93	1.04
Olomoucký region	0.98	0.94	1.01	0.96	0.74	1.04
Zlínský region	0.97	0.97	1.16	0.96	0.81	1.14
Moravskoslezský region	1.00	1.00	1.05	0.98	0.92	1.01

Table 3. Growth coefficient from years 2012 to 2013

NUTS 2	a_1	a_2	a_3	a_4	a_5	a_6
Capital city Prague	1.02	0.98	1.37	1.00	0.96	1.37
Středočeský region	0.99	1.02	1.11	0.97	1.03	1.08
Jihočeský region	0.97	0.97	0.97	0.96	0.71	1.06
Plzeňský region	0.97	0.97	1.25	0.94	1.03	1.19
Karlovarský region	1.03	0.96	1.12	1.03	0.96	1.03
Ústecký region	0.98	0.96	1.02	0.97	0.77	1.13
Liberecký region	0.90	1.06	0.96	0.92	0.96	0.94
Královéhradecký region	1.03	1.03	1.09	0.99	0.93	1.02
Pardubický region	0.97	0.97	1.29	0.96	0.62	1.08
Region Vysočina	0.97	1.03	0.97	0.99	0.98	1.01
Jihomoravský region	0.99	1.09	1.03	0.97	1.01	1.07
Olomoucký region	0.97	1.03	1.18	0.97	1.20	1.18
Zlínský region	1.00	1.07	1.04	0.99	1.02	1.07
Moravskoslezský region	0.97	1.00	0.97	0.96	1.01	1.05

Source: Authors

The average relative increment for indicator a_1 was reported only in case of the capital city Prague (Prague) (3%) and in case of Plzeňský region (2%). Pardubický and Moravskoslezský region reported zero value of this indicator. All the other regions report year on year decline in the observed indicator (biggest decline reported by Ústecký region 5%, this indicator demonstarted year on year decline by 10% for years 2012 and 2013). The average relative increment of indicator a_4 returned showed negative values in all of the observed regions, the highest rate of decline are in Ústecký region (6%), Karlovarský, Olomoucký and Zlínský regions show year on year decline by 4% on average.

The indicator a_2 from the point of view of the average relative increment did not demonstrate any changes for Prague, for Jihočeský and Moravskoslezský region. More dramatic decline was reported for Pardubický region (7%) and for Olomoucký and Ústecký region (6%). The highest relative increment in years 2012 and 2013 was documented for Jihomoravský region (9%), Zlínský region states 7% and Liberecký region 6%. The highest average relative increment for indicator a_5 the recalculated number of places in day live-in facilities in years 2008 to 2013 (11%) was indicated for Karlovarský region, positive value of 6% shows Plzeňský and Královehradecký regions (2%). The remaining regions, with the exception of Liberecký region (0%) showed the decline of the average relative increment. The biggest decline was identified in Olomoucký region (26%), in Zlínský region (19%) and in Ústecký region (17%). When comparing the value of relative increment (for years 2012 and 2013) there was reported a dramatic decline (by 38%) for Pardubický region, by 29% for Jihočeský region and by 23% for Ústecký region. A dramatic increase was demonstrated in Olomoucký region, by 20%.

The values of the average relative increase in indicator a_3 are dramatically different from the previous indicators a_1 and a_2. In the period 2008 to 2013 there was average year on year increase in Prague by 25%, in Zlínský region by 16%, in Plzeňský region by 14% and Středočeský region by 11%. There was reported decline only in two regions, Jihomoravský region by 1% and Liberecký region by 4%.

The highest relative increase of indicator a_3 (from years 2012 and 2013) is reported by Prague (by 37%), Pardubický region (29%) and Plzeňský region (25%). The lowest values were reported in Liberecký region (4%), Jihočeský, Vysočina and Moravskoslezský region (3%). Recalculated values of the number of places in these facilities per 100 000 seniors (a_6)

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demonstrate relative increment (calculated from years 2012 and 2013) by 37% in Prague, 19% in Plzeňský region, 18% in Olomoucký region and 13% in Ústecký region. Decline by 6% is demonstrated only in Liberecký region, that is the sole region stating year on year decline by 3% in the observed years 2008 to 2013.

Clustering was realized in IBM SPSS Statistics and available methods of HCM were used. Very similar dendrograms were achieved by an application of complete-linkage and Ward's method. The result of complete-link clustering can be seen in the Fig. 3. By [8] this method produces more compact clusters than the single-ling clustering methods and produces more useful hierarchies in many applications.

The Fig. 3 shows result of clustering on the basis of the average growth coeffitient in % of indicators a_1, ..., a_6. The interpretation of this dendrogram is the following: regions that are similar are connected by a straight line connecting very low; region linked far have little resemblance. There are three visible groups of regions. There are regions Vysočina, Moravskoslezský, Jihomoravský and Liberecký in the first one. The second group is represented by regions Ústecký, Zlínský, Jihočeský, Pardubický and Olomoucký. Regions Středočeský, Královéhradecký, Plzeňský and Karlovarský are in the last group of clustering. Prague is a part of the third group, but there is a greater rescaled distance (the stage of clustering is 11).

For the first cluster year on year decline of the average growth coefficient for indicators a_1, a_4 and a_5 is typical (this is concerns the status of social service retirement homes and the number of places in these homes including places in day live-in facilities). The indicator a_3 shows both increasing and decreasing values in this cluster and a very slight increase is demonstated in indicators a_2 (number of day live-in facilities per 100 000 seniors) and a_6 (number of places in homes with special regime per 100 000 seniors). The second cluster shows a decline in the value of the observed coefficients a_1, a_2, a_4 and also a_5 (indicator a_5 has a high value of decline year on year (-14% to -26%). The growth values are typical for a_3 and a_6 (year on year on average there is increase in the number of retirement homes with special regime per 100 000 seniors and in recalculated number of places in those homes). In the third cluster there is observed a dramatic growth of values in the observed coefficient for a_3, a_6 which is related to homes with special regime and decline at a_4 (number of places in retirement homes per 100 000 inhabitants for all regions).

Figure 3. Dendrogram using complete-link clustering

Source: Authors

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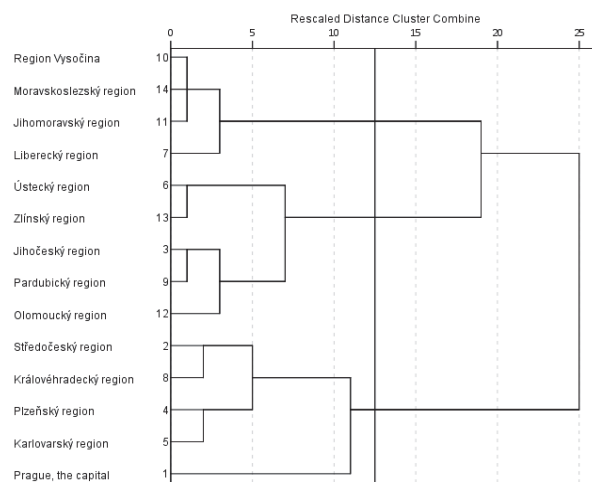
4 Conclusion

The expected development of the number of inhabitants will have the impact on all social systems, including the old-age pension system [3, 9, 15]. Older people experience change in their needs and requirements. We have to see their needs in a complex manner since the saturation of one need may influence the provision of another one. For instance moving to a senior home facility can improve the feeling of safety or self-fulfilment on the one hand, but it can break social relations the other hand [6].

In this contribution we have analysed data from RIS and the MPSV CR for years 2008 to 2013. It has been proven that the growth of the selected indicators in absolute values is a decline in relative values. This is valid for retirement homes, day live-in facilities, number of places in retirement homes and number of homes with special regimes. On the basis of the comparison of growth coefficients and relative increments of indicators from years 2012 and 2013 in CR regions the differences seem obvious. The indicator a_1 is growing in the capital city Prague, Královéhradecký and Karlovarský region; the values are stagnant or decreasing in other regions. Indicator a_2 shows decrease in Prague (2%), in Jihočeský, Plzeňský and Pardubický region (3%); in Karlovarský and Ústecký region (4%). The highest relative increase of indicator a_3 is reported by Prague (by 37%); the second highest value is in Plzeňský region (25%); the lowest values were reported in Liberecký region (4%), Jihočeský, Vysočina and Moravskoslezský region (3%). Indicator a_4 is only growing in Karlovarský region (3%); in Prague it is stagnant and values are declining in the rest of regions. Pardubický and Ústecký region are regions with the high decrease of values a_5 indicator (i.e. Pardubický region 38%; Ústecký region 23%). Growth coefficient of indicator a_6 is growing in all regions expect Liberecký region (-6%). The cluster analysis was used to comparison of regions based on growth coefficients (2008 to 2013).

It is possible to state that this data set can be used for the evaluation and comparison of social services development in the CR regions.

This analysis can be used for an optimization of the social care and better allocation of various financial resources (funds etc.) It is possible to focus on an analysis of developments and effectiveness of senior homes facilities and homes with special regimes, because these two types outcomes represent the highest capacity in social services [12] and also require the highest portion of social services expenditures.

Acknowledgements

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Internal Quality Assurance Practices in Czech Public Higher Education

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Abstract

The environment in which higher education institutions (HEIs) are operating has dramatically changed. Wider access to HE and new ways of government funding, has put pressure on accountability of HEIs. Increased competition and international mobility of students and staff has raised expectations about quality. As a result, delivering a high quality service has become an important strategic goal for the many HEIs, so they are forced to introduce internal mechanisms to manage quality. In order to effectively manage quality, it is important to be able to accurately measure it. Therefore, this article aims to examine which quality assurance practices (quality measurement and management instruments) are employed by Czech public HEIs. The findings suggest that Czech public HEIs employ a great variety of instruments to measure quality. But in order to effectively compete with domestic private HEIs, as well as internationally on the European HE market, they should be more proactive in employing quality management practices.

1 Introduction

The environment higher education institutions (HEIs) are operating in has dramatically changed from the 1990s. Globalisation resulted in emergence of international higher education (HE) marketplace with increased competition. Wider access to HE and new ways of government financing, brought pressure on accountability of HEIs. Further development of knowledge society and increased international mobility of students and staff raised expectations about quality of HEIs' services. [14] As a result, delivering quality service has become an important strategic goal for the HEIs.

In the European Union Bologna process put responsibility for quality assurance on HEIs, so they were forced to introduce internal mechanisms to manage quality. As a result, as the basic responsibility for quality assurance lies on the HEIs, internal quality mechanisms and practices they employ are vital for quality assurance in HE sector. [1] Therefore, this research aims to examine which quality assurance practices (namely quality measurement and management instruments) are employed by Czech public HEIs.

1.1 Quality in Higher Education

Quality is considered by many authors as an ambiguous, difficult to define term [13, and others]. Pfeffer and Coot [1991, in 13] referred to quality as a "*slippery concept*" because of wide variety of its meanings. No common view on what higher education quality is exist [2, 13, and others]. Therefore, it is considered that finding objective measures of quality is often conceptually controversial and technically difficult [2]. Nevertheless, HEIs strive to find instruments to effectively measure and manage quality.

1.2 Quality Measurement Instruments Employed in Higher Education

HEIs employ various instruments to gather information for quality assurance process: performance indicators, student, graduate and employee surveys, self-evaluation reports, etc. Some of the tools to measure HE quality will be considered in the detail below.

One of the approaches to measure quality is using *performance indicators*. Fitz-Gibbon argued that due to high complexity of education system, in the area of quality assurance "*the best strategy lies in improving the information of the system, particularly by defining and measuring the many outcomes that we care about and feeding back the measurements to the units of responsibility*" [Fitz-Gibbon, 1996, p.4 in 10, p.68].

Indicators have commonly been used in HE context. In recent years their utilisation was especially fuelled by increasing concern on accountability of HEIs by government agencies. Though having advantages, indicators are criticised for their lack of concern for some important aspects of education process, e.g. student development. Moreover, it is difficult to develop good indicators (relevant, communicable, resistant to manipulation, etc.), and even good indicators may be interpreted differently in different context. [10]

One of the commonly used instruments in internal quality measurement in HE are reviews and reports. Internal *peer reviews* and *self-evaluation reports* from HEI teachers and researchers may offer judgements and advice on development and organisation of new study programmes as well as modification of existing ones, etc. Self-evaluation reporting, being a common part of peer evaluation, is considered to serve as a critical review that raises awareness of quality issues. [14]

Harvey argues that *student feedback* may have two functions for HE institutions: "*internal information to guide improvement*" and "*external information for potential students and other stakeholders, including accountability and compliance requirements*" [7, p. 3]. Student feedback is commonly collected via student satisfaction surveys. Surveys can be carried out on institution, faculty, programme, and module-level, and in a form of teacher appraisal [7]. Besides student satisfaction surveys, a wide used tool of student involvement into quality assurance process is student representation systems, e.g. student representatives in Senate or student unions. Unlike student feedback, student representation practice provides direct input into discussion and decision-making process regarding institutional development in general and education programmes, in particular.

1.3 Quality Management Practices Employed in Higher Education

To assure high quality of education service, pure quality measurement is not enough. Therefore, HEIs go beyond quality measurement and employ various quality management practices, e.g. ISO standards, benchmarking, as well as service quality and performance models.

The first *ISO Standards* were introduced in 1987 based on TQM approach and have been revised several times since (in 1994 and 2000). The main purpose of ISO standards implementation is to create internationally accepted guidelines for quality assurance. [9] Though widely used ISO Standards are often criticised for their narrow approach to quality as conformity to specified requirements, and as a result, for not fully embracing TQM principles [9, and others].

Benchmarking has been utilised by business companies already in early 1990s. It is neither copying, nor imitating processes of other organisations, nor just comparison against statistical norms or standards; it also shouldn't be considered as quick and easy one-time event [1, 5]. According to Alstete [1, p. 33] benchmarking involves "*analyzing performance, practices and processes within or between organizations and industries to obtain information for self-improvement*". Epper [5] proposes that the essence of benchmarking is understanding own internal procedures, identifying 'best practices' and adapting those practices to the organisation in order to improve performance.

Though promising high results, application of benchmarking has its challenges in general and particularly in HE context. Firstly, benchmarking is rather effortful and time-consuming practice, as well as sufficient funding. Also its implementation needs prior knowledge and explicit commitment to change existing processes. But the main challenge in benchmarking is implementing the results: benchmarking methodology itself doesn't provide organizations with any mechanism on how to do it. [5]

Most well-known *service quality models* employed in HE is *GAPs model* and *SERVQUAL* instrument developed by Zeithaml, Berry and Parasuraman. SERVQUAL instrument is used for analysing the gap between student expectation and perceptions of the education service. With the help of the GAP model HEIs can identify problems in the processes of developing and providing education service that may affect its quality. SERVQUAL has been widely and successfully employed in HE quality assurance [e.g. 11, and others]. But it has also been a subject of criticism from some researchers [3, and others].

The European Foundation for Quality Management *(EFQM) Excellence Model,* developed in 1991 based on TQM principles, aims at continuous improvement of an organisation [8]. The framework is based on 9 criteria: 5 'enablers' (leadership; strategy; people; partnerships and resources; and processes, products, and services) and 4 'results' (customer, people, society and business results). The EFQM logic states that *"if the right Enablers are effectively implemented, an organisation will achieve the Results they, and their stakeholders, expect"* [4]. Though being used widely, implementation of the EFQM model in HE is challenging, e.g. Osseo-Asare and Longbottom [12] argue that it is too prescriptive and time consuming, its implementation needs prior knowledge and deliberate strategy, as well as there is a high degree of subjectivity in scoring. A modified EFQM model was developed within project of the Ministry of Education, Youth and Sports 'Providing and evaluating quality system of tertiary education' to assist Czech HEIs and government agencies in performing internal and external quality evaluation.

2 Material and Methods

With accordance to the research aim, a qualitative research procedure was chosen for the research. Data on internal quality assurance instruments and practices was gathered from strategic/corporate documentation (mainly annual reports), available to the general public, and official websites of HEIs. An individual chapter of the HEI's annual reports was usually devoted to quality assurance. The data was collected in August 2015, and then analysed and grouped according to its content similarity. The research was conducted among 26 Czech public HEIs from the list of the Czech HE institutions available on the official web-site of the Ministry of Education, Youth and Sport.

The research was not aiming at examining which quality assurance instruments were used more often than others, therefore, quantitative analysis is only indicative. This decision was made mainly due to the limitation on this research – the data presented in the reports may not be complete as HEIs have different assumptions on what is to include into annual reports and what is not. As a result, statistical analysis of the data available might have not been reliable.

3 Results and Discussion

Results of the research have shown that, in their quality assurance efforts, Czech public HEIs focus mainly on teaching and academic research quality. Nevertheless such areas as technical support of the education process and other complementary services are also included in the quality assurance process.

Surveyed HEIs employ various quality assurance practices. Some HEIs perform quality measurement on institutional level, in others faculties are responsible for development and

performance of quality measurement, and some have a combination of both. Also often departments themselves are responsible for carrying out quality measurement activities.

Majority of HEIs have their own internal methodological documents, developed based on national and international standards (e.g. Standards and Guidelines for Quality Assurance in the European Higher Education). Few HEIs claim that they have an institution-wide quality evaluation system. Almost a quarter of surveyed HEIs are currently developing an institution-wide quality assurance and measurement system. The design of the systems in their majority is based on the results of the project 'Providing and evaluating quality system of tertiary education'. Such a situation in the Czech Republic could be explained by a preparation of a new higher education law that will most probably introduce an institutional accreditation. The institutional accreditation means that HEIs are not subjected to programme accreditation. But in order to be awarded with the institutional accreditation a HEI must have a mature institution-wide quality assurance system.

When describing their quality assurance practices in the annual reports, surveyed HEIs mainly focus on quality measurement processes and instruments. Quantitative and qualitative indicators as well as surveys are most commonly used tools in quality measurement. The usage of the term 'quality management' is scarce in the documents analysed. From the managerial instruments and practices, only benchmarking (often not to the full extent) and ISO standards (by few HEIs) are utilised. One faculty of one HEI (artistic) employs modified EFQM model. Only few unique cases of utilisation of other managerial tools in quality assurance, like Key Performance Indicators or Management by Objectives, were registered. The quality measurement and management instruments Czech public HEIs employ will be considered further in more detail (grouped by type).

As it has been mentioned earlier, in the analysed documents HEIs mainly focus on the description of quality measurement instruments and practices they employ. Analysis and evaluation of quality measurement results usually takes form of self-evaluation reports or internal reviews that are widely utilised by Czech public HEIs. These reports and other results of various quality measurement activities are most commonly discussed, analysed, and evaluated in meetings of committees and councils (e.g. the Scientific Council, the Academic Council, Dean's and Rector's Advisory Boards, etc.) and meetings of HEI management at different levels (departments, faculties, and institutional). Based on these discussions the measures are taken. Some HEIs have specific organisational units, e.g. quality councils, departments or institutes that facilitate quality measurement and analyse its results. Unfortunately, HEIs don't specify in detail how exactly quality measurement results are acted upon, and how the results of adopted measures are evaluated. This might be a sign that HEIs don't fully understand the importance of these final steps of quality assurance. On the other hand, this finding might be caused by the data source used in the research: HEIs might not feel obliged to mention their internal quality assurance practices in annual reports in detail, but include this information into other quality-related internal documents instead.

3.1 Indicators

According to the results of the research one of the most popular quality measurement instrument among HEIs are indicators. The indicators can be quantitative (most common) and qualitative (one institution considered verbal indicators as more suitable for characterisation of education).

Indicators are utilised in various areas, e.g. *strategic indicators* are usually objectives stated within strategic plans, other indicators focus on *education process, human resources, facilities and infrastructure*. Unfortunately, from the annual reports it was possible to gain detailed description only of the indicators concerning education process and human resources that will be described further.

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Education Process Indicators

Education process indicators mainly focus on students. These indicators can be categorised into three groups: indicators concerning prospective, current students and alumni.

First group of indicators analyse demand for study programmes from prospective students, as well as interest from foreign students. Amount of students who applied for study programmes in an institution, amount of enrolled students in different programmes and on different levels (Bachelor, Master, and PhD) is often measured by HEIs.

Second group of indicators concerns structure of a current student population, their workload and results. It includes the following indicators: amount of students in courses, study programmes or per an academic worker; student mobility; length of studies in study programmes; students' workload and activities; students' achievements, etc.

Third group of indicators examines alumni employment. Via these indicators HEIs can measure output quality of education process – graduates, as well as how well their education programmes fit the needs of employers.

Human Resources Indicators

Being a professional service organisation, academic workers are HEI's most important asset. Therefore, HEIs develop various tools to measure their quality. Quality of academics is usually assessed by several quantitative and qualitative indicators in the areas of teaching, scientific and research activities (including number of publications, participation in research, contractual projects and grants), creative/artistic activities, other activities beyond routine responsibilities, international activities, and qualification and professional development, etc. Quantitative indicators are also often used for measuring quality of academic workforce. Common areas of concern are structure of academic workforce (age, qualification, specialisation); their mobility.

3.2 Surveys

The most common type of qualitative instruments used in quality measurement are surveys. Czech public HEIs carry out surveys among their main external and internal stakeholders – students, employers, high school students, alumni, the public, as well as staff. Information from these surveys is used to plan innovation and changes in education processes. From surveying academics (as their internal customers), for example, HEIs can receive feedback on functioning of the department, Dean's office or management of the university. From all the types of surveys, most widespread are student feedback surveys.

Student Feedback Surveys

Surveyed HEIs carry out various student feedback surveys, from specific course- or teacher related, to study programme or overall satisfaction surveys, as well as surveys devoted to specific aspects of their education experience.

Almost all surveyed HEIs report having course or teacher-related surveys among students. These surveys mainly concern such common issues as quality of teaching methods, difficulty of courses, academic qualification of the teacher in the field, availability and quality of study materials, but sometimes also such topics as importance of the course, intersection of the course material with other courses, and its suitability for study programme.

Also surveys may concern quality of study programmes or fields of study offered in the HE. These surveys usually focus on teaching quality, administration of student affairs, organisation of studies, quality of IT services relating to the studies administration, etc.

Even broader surveys exist. They are usually called study experience or education service quality surveys. These surveys are usually devoted to various matters from teaching quality to quality of administration services and facilities.

Surveys may also deal with some specific topics, for example, atmosphere and communication, general organisation of studies, admission and beginning of studies, or functioning of Dean's office, evaluation of study plans, evaluation of students' influence on HEI management, etc. Specific surveys may also aim at different target groups: admission and adaptation of first-year students; expectations from Master's studies of first-year students in Master's programmes; satisfaction education experience in a HEI of foreign students; reasons for not finishing studies, etc.

3.3 External Quality Measurement Practices Used for Internal Quality Assurance Purposes

Some external quality measurement practices and instruments are employed by Czech public HEIs for the purposes of internal quality assurance. They can be either carried out within HEIs (e.g. internal audit or accreditation), or may take form of external evaluations used for internal purposes (for example, voluntary peer reviews and accreditations, or reviews from external stakeholders).

An important part of quality management in HEIs is *internal accreditation*. Some HEIs simulate external accreditation process to monitor quality of study fields. Some HEIs take internal reporting to the next level and perform *internal audit.* Internal audit is usually used to evaluate whether internal standards are in accordance to law, or to identify problematic areas in institution's management.

In the majority of the cases, *external peer reviews* are carried out by expert commissions from various international associations and organisations, general (e.g. European University Association) and specialisation-specific (e.g. European Association of Establishments for Veterinary Education (EAEVE), or the European Lead of Institutes of the Arts (ELIA), etc.). Common reason for such external evaluation is institution's voluntary application for *international accreditation* (e.g. EPAS accreditation provided by European Foundation for Management Development).

A few institutions also hire external firms to perform *surveillance audit* (e.g. quality management system audit according to ISO standards). Several HEIs participate in various HE *development projects* organised by the Ministry of Education, Youth and Sports (e.g. mentioned earlier project 'Providing and evaluating quality system of tertiary education', project KREDO (Quality Relevance Effectiveness Diversification and Openness of Higher Education in the Czech Republic), etc.), and international (e.g. Graduate Barometer). Participating in these projects usually means that HEIs are audited and/or peer reviewed in the areas of their education service quality, quality evaluation system, etc.

Reviews from HEI's stakeholders are also utilised in measuring quality of study fields. Students and alumni, external academics (from other HEIs domestic and foreign) may participate in such reviews. The results of such evaluations are usually discussed at scientific and teaching committees, Senate, or Rector's office.

3.4 Other Quality Measurement Instruments

Besides already mentioned quality measurement instruments, surveyed HEIs also used other tools. For example, most often mentioned method of teaching quality evaluation (besides student surveys) is *observation* by department heads, fellow academics. It is considered that innovation in teaching quality is facilitated by sharing experience among academics. *Evaluation of educational documentation* (a concept of a course, teaching materials) is also used to monitor quality of teaching. The results are discussed directly with a teacher/guarantor of a course or in a form of seminars for more participants.

Additionally to surveys, HEIs use other tools to receive feedback from their stakeholders, for instance, via *interviews* and *discussions*. Individual and group discussions with students may concern certain courses or can be organised on the faculty level (e.g. with the Dean). One HEI

argues that interviews with students are a source of authentic findings, proposes, and requirements form students. Some HEIs organise regular *meetings* with other stakeholders, e.g. alumni, or directors of high schools. Sometimes new teachers or incoming international academics are asked to reflect on their experience in an institution.

Another way to receive student feedback is through *student representation system*. Students' participation in the Senate, or various committees, strategic and project teams, can also be used for purposes of quality assurance.

One HEI organises formal and informal discussions with representatives from students (student chamber of an academic senate) as a way to improve quality. To find out what current students think about their home institution some HEIs *analyse posts on student portals* (e.g. www.primat.cz) and web-pages of student organisations. Another source of student feedback may be complaints submitted by students.

Besides quality measurement instruments mentioned earlier, one more possibility to assess HEI's quality and compare it to other intuitions is *participating in various national and international contests*. HEIs may either participate in the contests as an institution (e.g. contests devoted for example to innovative activities of HEIs, or their evaluation by students, etc.), or send their students or academics to national and international contests.

3.5 Quality Management Instruments

As it was mentioned earlier, only a few quality management instruments are employed by Czech public HEIs. Two of them – benchmarking and ISO standards, are considered further.

Benchmarking

One of the sections of HEIs annual reports is devoted to benchmarking. Almost all surveyed HEIs (more than 85%) report carrying out external benchmarking, although benchmarking practices considerably vary among institutions. Only one HEI reported utilization of internal benchmarking.

Most common form of benchmarking among Czech public HEIs is *comparison* with other HEIs domestically or internationally. Comparisons can be performed in various ways, e.g. by observing other HEIs and comparing them to oneself, by mapping HEIs with similar specialisation, or in a form of various analytical reports. Comparisons are made on institutional, faculty, or programme level. Such practices, though called 'benchmarking', don't fully reflect the essence of the concept.

More than half of HEIs (employing benchmarking practices) monitor *national and international rankings*. HEIs analyse, for example, reviews of faculties prepared by Czech newspaper Hospodářské noviny, or rankings based on students and alumni evaluation of Czech HEIs. Czech HEIs also monitor international rankings, like Quacquarelli Symonds (QS) World University Rankings, U-Multitrank, or The Times Higher Education World University Rankings. Unfortunately, rankings might not be the best source of information for internal quality assurance as they were originally developed as an external performance assessment instrument which aim is to provide transparency in HE system. And therefore they have certain limitations when used for internal quality assurance: rankings strive for a broad inclusion of HEIs, and as a result they lack in-depth analysis; they do not have an explicit and theoretically grounded concept for quality, but develop a specific set of indicators with regard to their aims, target audience, and often to the availability of data. Thus they should be used with caution. [6]

Several surveyed HEIs also reported that they carry out benchmarking via *participating in international associations and networks*, where they can share competences and experiences in quality assurance, administration issues, teaching, and various other areas with fellow HEIs.

Competence sharing can be also facilitated via mutual *visits* of managers, teachers, and students among HEIs. Student and teacher mobility programmes may help to compare student programmes and courses.

Very few HEIs reported *cooperation* with other institutions (nationally and internationally) as a part of their benchmarking efforts. HEIs usually don't specify nature of their partnerships and cooperation projects in the annual reports.

ISO Standards

The survey among Czech public HEIs has shown that *ISO certification* is not widespread in the Czech public HE sector: only 4 of 26 HEIs report having ISO 9001:2009 certification for quality management system (for entire HEI or its part, e.g. rector's office, one department, or a Lifelong learning Centre), and one institution has ISO 9001:2008 certificate. On the other hand, HEIs that employ ISO standards consider them beneficial for quality improvement, due to their emphasis on continuous improvement, transparency of the processes, raising satisfaction of education process participants, as well as improvement in institution's image and credibility.

4   Conclusion

Based on the results of the research it can be concluded that Czech public HEIs employ a variety of existing and develop (modify) new quality measurement instruments. Although the well-known methods, like indicators, surveys, self-evaluation reports, etc. are still most used. But unfortunately, HEIs rarely go beyond quality measurement to active quality management. Several institutions have or are in the process of developing institution-wide quality evaluation systems. But the usage of the term 'quality management' is scarce in the documents analysed. From the instruments that go beyond mere quality evaluation are used only ISO standards (by few HEIs) and benchmarking (often not to the full extent).

The results of the research should be considered with care due to the data source used. It is possible that information on some quality assurance practices and tools used in the annual reports and other official documentation is not detailed enough, or even omitted. Despite that, it was possible to create a general picture of what instruments Czech public HEIs employ in their quality assurance practices.

As a result, it could be concluded that there is still a space for further improvement in the area of quality assurance among Czech public HEIs. And in order to effectively compete with domestically as well as internationally on the European HE market they should be more proactive in managing quality and employing quality management practices.

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Expected Level of State, Entrepreneurship and Individual Responsibility for Improving Quality of Life

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Abstract

This article presents an approach to the analysis of selected attributes of quality of life (QoL), based on the Kano model. The aim of the article is to empirically examine the importance of these attributes for an individual. A group of 17 most mentioned and systematically measured attributes of quality of life were defined by literature review and data from international databases. The importance of these attributes and their impact on the satisfaction of individuals were subsequently examined using the Kano model methodology (which is based on questionnaires) and supporting statistical tools. The results were then interpreted and generalized by categorizing particular attributes into three main categories: Must-be, One-dimensional and Attractive. The research then focused on the level of state, entrepreneurship, and individual responsibility for realizing particular QoL attributes.

Keywords: quality of life; state responsibility; entrepreneurship responsibility; individual responsibility; Kano model

1 Introduction

Among the current social challenges we may find the notion of Quality of Life (QoL) that often gets attention from governments, researchers and third sector agencies [1] [21]. Several approaches, usually based on indicators [25], are used to evaluate the level of improvement of QoL. Although several metrics have been devised to measure quality of life (QoL), not much attention has been paid to justification of these metrics. By 'justification' we mean answering questions like whether a certain factor/indicator is appropriate for measuring QoL, and whether the effects of the indicator on the perceived QoL can be manifested. Looking at these issues in this way could help us better understand the elements which affect satisfaction of citizens and improve their QoL. Governments mostly use indicators to monitor progress in particular areas and to identify areas which need improvement [10]. However, regarding improvement of QoL, theory seems to suggest that various interested parties affect particular QoL attributes to a different extent [18]. The aim of this study is to analyze the relation between particular QoL attributes and individual satisfaction, and to identify the level of state, entrepreneurship, and individual responsibility for realizing these attributes.

1.1 Quality and Satisfaction

Quality is the extent to which requirements (expectations or demands) are met [12]. Therefore, improving quality essentially means better meeting the demands and expectations. In this study, we will be using the term 'requirements' to refer to demands and expectations. In areas that focus on management, the term 'quality' is often seen together with the term '(customer) satisfaction'. ISO 9000 defines customer satsifaction as 'the extent to which customer requirements are met, as perceived by the customer' [14]. Although this is a business-inspired definition, satisfaction is the key indicator of quality [16]. ISO also states that even if the requirements are met, it does not necessarily lead to more customer satisfaction. This seeming contradiction can be explained using theory of quality which says that individual satisfaction is

affected by only a small number of attributes, but the customer sees those attributes as important [2] [5]. Based on this principle, various methods that quantify perception of meeting requirements, like CSI, Attibute method, or the Kano model [13], have been developed to measure customer satisfaction.

1.2 Measurement of Quality of Life

If one reviews academic sources, he/she will encounter a rising interest in quality of life. For instance, in the Scopus database, there were 447 articles on quality of life in the year 2000, 997 articles in 2010, and the number rose to 1274 in 2014. A review of the media and international or European institutions also shows how important this subject has become. Quality of life is even one of the programme priorities in EU's Programming Period 2014-2020 [7]. This subject has been the focus of considerable research from the perspective of economic factors (Quality of Life Index, Human Development Index, Genuine Progress Indicator) and human values (World Values Survey, Life Quality Index), and also from a general perspective (Satisfaction with Life Index, Happy Planet Index) [24].

At present, quality of life is measured using several different metrics of specialized institutions (OECD, Gallup, Mercer, The Economist), but their results usually do not agree much. All of these metrics use their own particular interpretation of quality of life and their results may vary according to the metrics used [24]. Some institutions use objectively measurable macroeconomic, demographic and social indicators [27], while other insitutions focus on indicators of perception acquired in national surveys [9]. Although there is evident effort to define a final number of QoL attributes, several authors maintain this is impossible because the society and its demands change and develop over time [19] [22].

This naturally leads to several research questions: What, and to what extent, affects quality of life of today's individuals? Which QoL attributes do individuals perceive as key for their life satisfaction? What role do the state (public sector), entrepreneurs, and individuals play in reaching a certain level of QoL?

The aim of this study is to offer some answers to these questions, based on empirical examination of selected QoL attributes. We realized this research by means of a survey conducted in the Slovak republic. Simple random sampling was used to collect the data. To quantitatively assess the importance of QoL attributes, and then to categorize them, we used the Kano model methodology [23] which is used to classify requirements of individuals and to evaluate the influence of these requirements on the overall satisfaction of individuals. This study, therefore, does not express QoL according to various attributes, it investigates the importance of the attributes and their effect on satisfaction of individuals.

2   Material and Methods

By means of expert assessment, 17 QoL attributes were chosen from the three most common approaches used to measure individual quality of life - OECD Better Life Index, Gallup Well-being Index, and Mercer Quality of Living. 'Expert assessment' means that each of the attributes was assessed according to three criteria: clarity of meaning, suitability for certain country, and risk of duplicity. In this manner, a total of 27 attributes of QoL were assessed – 10 from Mercer, 11 from OECD and 6 from Gallup.

As the next step, we created a Kano questionnaire containing the chosen 17 attributes. The author of the concept of Kano questionnaire, professor Kano, proved that customer satisfaction is a non-linear function of product functionality and consists of three main components: must-be component, one-dimensional component, and attractive component [15]. Based on this, professor Kano stated that the various demands of individuals require different amount of attention, and this fact affects the resulting overall satisfaction. A Kano questionnaire differs

from standard surveys by giving a better overview of the effect of meeting/not meeting a requirement on the overall customer satisfaction. Standard Kano methodology classifies requirements using a functional and dysfunctional verbal statement of requirements, which are assessed on an evaluation sheet [17]. This sheet consists of 25 (5x5) fields which contain 5 categories of requirements: Must-be, One-dimensional, Attractive, Indifferent and Reverse. Research design and basic logic of the Kano model are shown in Figure 1.

Figure 1. Research design and the basic logic of Kano model
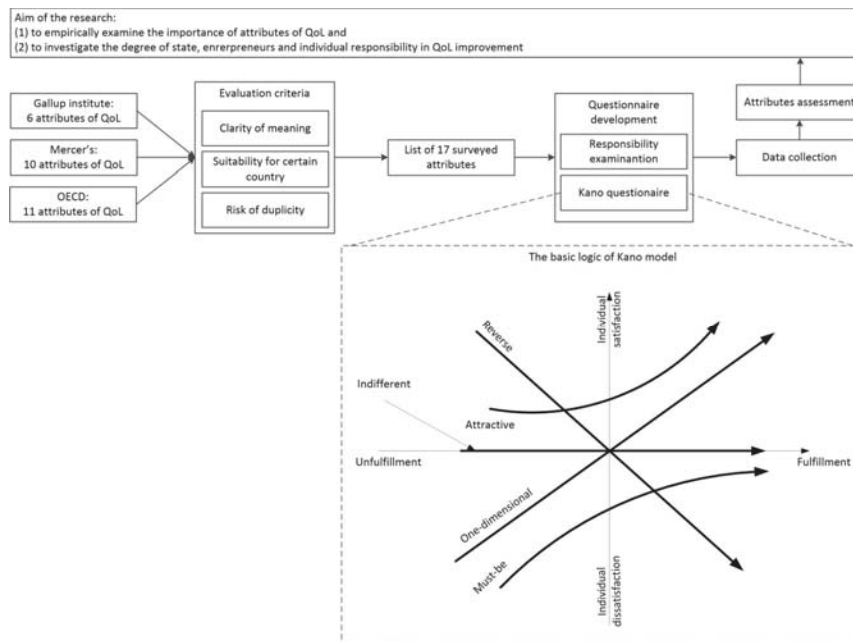
Source: Authors

Even though individuals perceive 'Must-be' requirements as a matter-of-course and they almost never explicitly mention them [20], there is no increase of satisfaction without 'automatically' meeting these requirements. 'One-dimensional' requirements increase satisfaction in a linear manner – the more they are met, the more satisfaction there is. 'Attractive' requirements lead to a significant increase of satisfaction. They create excitement and positive surprise [3]. On the other hand, requirements with no obvious direct effect on satisfaction are 'Indifferent'. And finally, 'Reverse' requirements are requirements that customers do not want, and meeting these requirements only decreases satisfaction.

There are many studies explicating the usage of the Kano model and its modifications [28]. We decided to use this model for empirical examination of QoL attributes for the following reasons: (1) Kano model helps us better understand the importance of individual requirements (attributes) in evaluating the overall satisfaction (quality), (2) Kano model is able to categorize the attributes into exactly defined groups, (3) using the Kano model, one can better examine the validity of particular attributes with respect to QoL.

Into our Kano questionnaire we also implemented subjective assessment of responsibility for particular QoL attributes. Respondents expressed their personal views on who and to what extent is responsible for realizing particular attributes – whether it is the state, or their employers, or the respondents themselves as individuals. The results were then processed and we created a ranking of QoL attributes – from Must-be attributes up to the Attractive attributes.

3 Results and Discussion

Our results are based on a random sample survey among a group of respondents. We acquired a total of 595 valid responses. Consistency of the data set was tested using four reliability tests. Cronbach's alpha reached 0.832, Spearman-Brown coefficient in a split-half test reached 0.795 and 0.795, Guttman's lambda 2 reached 0.836, and a chi-squared test with the significance level of 0.000 also proved that the data set is reliable.

The size of the sample and confidence interval of 95% leave us with admissible error of 4.02. The sample is thus proved to be statistically reliable enough. The data set was also examined using a factor analysis algorithm in order to identify potential variable reduction. Even though Kayser-Meier-Olkin test reached 0.891, factor analysis with 4 factors (software recommendation) explained only 48.23% of the variability. For this reason, all the variables (QoL attributes) can be considered independent areas with no significant overlapping.

The respondents in our survey expressed their opinions regarding 17 selected QoL attributes. They were supposed to assess the level of their satisfaction in the hypothetical case these attributes were or were not realized in their life. This approach is derived from the Kano methodology and it enables us to measure the extent to which a particular attribute affects individual satisfaction. Each attribute was therefore put into one of six categories:

a) attractive attribute – increases individual satisfaction exponentially; value 3
b) one-dimensional attribute – increases individual satisfaction linearly; value 2
c) must-be attribute – leads to degressive increase of satisfaction, but has profound effect on dissatisfaction; value 1
d) reversible attribute – individuals do not want this attribute, it decreases their satisfaction; value -2
e) questionable attribute – invalid (illogical) response; 'missing value' – most studies do not use this category and we also leave it out

After reviewing the correlation structure of all the variables we found no significant correlations – thus we can say that the 17 selected QoL attributes are relatively independent and their selection was correct. Table 1 shows the average value for each attribute according to category values presented above in a) to f), the standard deviation of the attribute, the category assignment according to the standard Kano methodology, and new names for the categories proposed by the authors, based on the results of this research.

According to the respondents, 'One's health' is the QoL attribute with the strongest effect on individual satisfaction. This is a relatively stable element showing similar results for respondents of different age. This result is in accord with several studies conducted in advanced economies (mostly USA), which confirm that health belongs to most important values among people with average or above-average living standard. 'Harmonious family' affects individual satisfaction approximately linearly (the value is 1.88). Its importance increases slightly with older respondents. On the other hand, 'Income', which is next in the ranking, shows rapidly decreasing importance as people get older. While income directly affects satisfaction in the youngest group of people under 25 years of age, it gradually loses its importance until it doesn't significantly affect individual satisfaction (it becomes a 'Must-be'), but it has a profound effect on individual dissatisfaction. The two above-mentioned results implicitly confirm the so-called Easterlin Paradox which states that high income has a direct effect on happiness, but in long

term this effect diminishes. The next ranks are occupied by a group of relatively stable QoL attributes: 'Safety', 'Harmony between personal and professional life', and 'One's own house/living'. These are relatively stable aspects, and in advanced countries they are taken for matter-of-course. 'Career' shows an interesting effect on overall satisfaction of individuals – while young people perceive this attribute as important, for older people it becomes rather irrelevant (it moves into the 'indifferent' zone). This result also confirms the already mentioned Easterlin Paradox. The next attributes show similar and relatively stable results: 'Quality of workplace relationships', 'Risk of losing one's job', 'Quality of the environment', 'Self-fulfillment', 'Right to education', 'Workplace loyalty'. These are fundamental aspects and not meeting them leads to a high level of individual dissatisfaction. Meeting them, on the other hand, has only a minor effect on individual satisfaction. The lowest ranks are occupied by 'Freedom to express disagreement', 'Lifelong learning', 'Equal job opportunities for men and women', and 'Community involvement'. 'Community involvement' shows the highest values for respondents aged between 30 and 40 years. These aspects are relevant for the area of basic rights and freedoms, and so their position in the group of all the aspects is obvious.

Table 1. Results

Rank	QoL Attributes	Av.	SD	Kano category [28]	Interval	Category name proposed by authors
-				Attractive attributes (highly attractive)	(2,57;3,00 >	Wow
-				Attractive attributes (less attractive)	(2,14;2,57>	Positive surprises
1.	One's health	2,12	,694			
2.	Harmonious family	1,88	1,132	One-dimensional attributes (high value-added)	(1,71;2,14>	Higher standards
3.	Income	1,76	1,425			
4.	Safety	1,64	1,063			
5.	Harmony between personal and professional life	1,64	1,181			
6.	One's own house/living	1,58	1,265	One-dimensional attributes (low value-added)	(1,29;1,71>	Matter-of-course
7.	Career	1,48	1,294			
8.	Quality of workplace relationships	1,35	1,206			
9.	Risk of losing one's job	1,34	1,159			
10.	Quality of the environment	1,28	1,216			
11.	Self-fulfillment	1,27	1,244	Must-be attributes (necessary)	(0,86;1,29>	Essentials
12.	Right to education	1,13	1,081			
13.	Workplace loyalty	1,07	1,249			
14.	Freedom to express disagreement	,85	1,114			
15.	Lifelong learning	,83	1,198	Must-be attributes (critical)	(0,43;0,86>	Human rights
16.	Equal job opportunities for men and women	,69	1,153			
17.	Community involvement	,43	,921	Indifferent attributes	(0;0,43>	Indifferent

interval calculated according to extension categories of Kano model

Source: Authors

After examining QoL attributes, we focused on the responsibility of the interested parties for increasing these QoL attributes. The results present a mean of respondent evaluations of

attributes from the categories proposed by the authors. If we look at how competences are distributed, we can observe an interesting fact: the more attractive the requirements are (i.e., they have a stronger effect on individual satisfaction), the less they are affected by the state, and more emphasis is put on the role of the individual. Figure 3 presents a graphic interpretation of the result. Our results correspond to a large extent with the theory of social responsibility [4] and also with concepts focused on the role of the state in society [26] [8]. Based on our results we can say that the state plays the most important role in meeting the essential demands of citizens, and as the quality of life increases, the focus shifts to entrepreneurs (employers) and then to individuals themselves. Our results might be supported by further research aimed at requiring more specific data that would help to identify the unknown attributes shown in Figure 3.

Based on the results presented in this study we may formulate a potential research hypothesis: If the basic rights of an individual are safeguarded by the state and that individual's employer contributes to meeting the higher demands of the individual, and the individual is still not satisfied with his/her QoL, then it is the individual himself/herself who can change that.

Figure 2. Position of QoL attributes in the Kano model
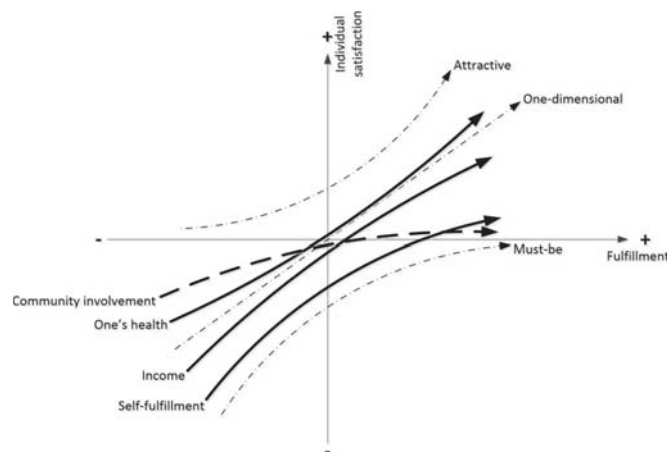
Source: Authors

Table 2. Responsibility of interested parties - evaluation results

Category of QoL attributes (proposed by authors)	Level of responsibility		
	State	Employer (entrepreneur)	Individual
Indifferent	43,2%	13,1%	43,7%
Human rights	61,0%	38,8%	0,2%
Essentials	34,9%	36,7%	28,4%
Matter-of-course	13,2%	52,0%	34,8%
Higher standards	8,4%	32,6%	59,0%
Positive surprises	-	-	-
Wow	-	-	-

Source: Authors

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This hypothesis can be supported by a number of studies focused on personal development which consider this subject to be very important especially for developed countries [11]. Further research may also find inspiration in theories of motivation [6] or in theories that focus on needs and wants [18].

Even though we based our analysis of QoL attributes on the Kano model methodology which is well respected in academic circles, there might exist certain potential biases that may have affected the results. The selection of QoL attributes could be the first bias. The evaluation criteria and indicators for measuring QoL we used are generally accepted but it is necessary to mention that there are several other approaches to measuring QoL based on objective [9] as well as subjective [19] indicators. The territorial limitation of our research may be another potential bias and the admissible error might also have affected the results, even though it reached a low value. Nevertheless, we think that this study presents a rather unique approach to the research of quality of life and its attributes.

Figure 3. The level of responsibility of surveyed stakeholders according to categories of QoL attributes
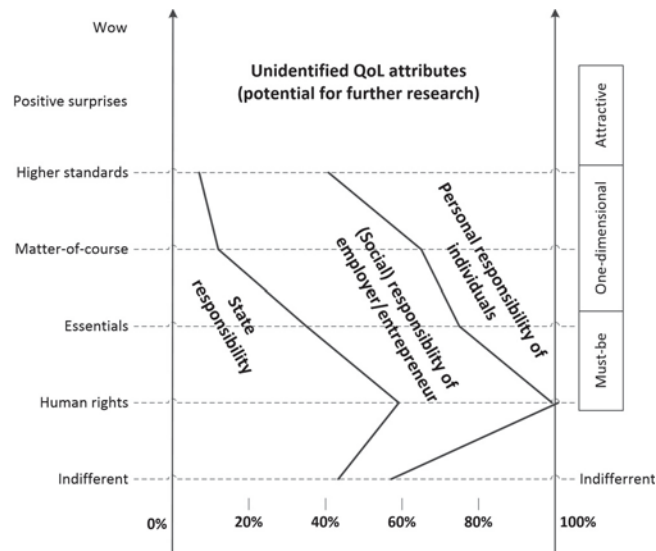
Source: Authors

4   Conclusion

The aim of this study was to empirically examine the importance of QoL attributes and to investigate the level of state, entrepreneurship and individual responsibility for improving QoL. To reach this goal, we examined the most common metrics used for measuring QoL and we created a list of 17 attributes to be examined. These attributes were then implemented into a questionnaire. The purpose of the questionnaire was to categorize the attributes according to the Kano model and to examine responsibility. A survey was conducted and the obtained data was processed and evaluated. The resulting ranking and categorization of QoL attributes are the main results of this examination. The ranking enables us to identify the extent to which a particular attribute affects satisfaction of individuals. Categorization of these attributes lead to 5

categories with different levels of importance for individuals – Indifferent, Human rights, Essentials, Matter-of-course, and Higher standards. At the same time, we proposed two new categories – Positive surprises and Wow – which are potential subjects for further research. Our results also empirically support those theoretical approaches which claim that among all interested parties, the state plays the key role in satisfying the basic needs of individuals, while its role in fulfilling individuals' wants gradually decreases.

The aim of this study was to suggest possible topics for further research. Since we paid attention to those particular areas which are most often used to measure quality of life, our research in this case was limited. The results, however, may be utilized in research of broader contextual relations, whether in the area of public administration and the role of the state (historical and other factors affecting QoL), or in the field of corporate social responsibility (the level of entrepreneurship responsibility vis-à-vis the society), or in the area of individual responsibility for one's quality of life.

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Appropriateness of Cost-Effectiveness Analysis in Water Management: A Comparison of Cost Evaluations in Small and Large Catchment Areas

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Abstract

The growing demand for clean water has led to the adoption of the EU Water Framework Directive (Directive 2000/60 EC; WFD). The new legislation has had a major impact on water management and national economies and instituted numerous requirements, including "good status" of all water bodies by 2015. However, achieving "good status" is associated with large investments, often beyond the capabilities of polluters. In justified cases, member states may request an extension of the deadline based on disproportionality of the costs of meeting the WFD requirements. Based on the requirements of the Directive, cost-effectiveness analysis (CEA) has become an integral part of the process of identifying and proposing measures. This tool is used to determine the most cost-effective way to achieve "good status". This result is also an important input into the cost-benefit analysis, which is used to justify the exemption. This paper presents and discusses the practical and methodological differences in cost evaluations in small and large catchment areas in the Czech Republic.

Keywords: cost-effectiveness analysis; water management; Water Framework Directive; good status; disproportionality of the costs

JEL Classification: Q530, Q580

1 Introduction

The Water Framework Directive [5], further referred to as the Directive, has introduced a comprehensive perspective of river basin management and institutionalised numerous analytical tools of socioeconomic research that have not been widely applied. Particularly, evaluation of measures proposed to reach "good status" of a water body is promoted within the economic analysis. Such evaluation usually calls for the application of standardised methods of environmental economics, such as cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA), which should be complemented with more qualitative institutional analysis and a stakeholder consultation process [13].

Specifically, the use of CEA is emphasised in order to judge the proportionality of costs of different types of measures. In justified cases (according to Article 4 of [5]), it is possible to apply an exemption due disproportionate costs of measures ([7] and [12]). However, the practical applicability of both CBA and CEA struggles with data availability and a large uncertainty of future costs of implementation and impacts (especially regarding the calculation of costs and benefits of planned water quality improvement measures). The data problem is aggravated when considering large catchment areas with complex environmental and social linkages.

The purpose of the paper is to show practically how the methodological challenges of CEA increase together with the territory in focus. We introduce two in-depth case-studies of the Orlík reservoir (as a large catchment area) and the Stanovice reservoir (as a small one) undertaken in the Czech Republic in 2013–2015. The intention is to discuss how to interpret results produced with imperfect data under time and resource constrains.

The paper consists of three chapters. The first chapter summarises the existing applications of CEA and the basic steps in the analysis. The second chapter presents results of two complex studies of cost-effectiveness of measures in the Orlík and Stanovice reservoirs. The aim of that chapter is to show the different options and appropriate tools for processing studies based on a spatial scale or catchment size. The further appropriateness of CEA application is discussed in the conclusion.

2 Material and Methods

2.1 Existing Applications of Cost-Effectiveness Analysis

According to the current requirements of the Directive, CEA should be processed as part of River Basin Management Plans (RBMP). In practice, however, this process is often omitted and only one pre-selected set of measures is promoted. CEA is elaborated often only in connection with proportionality analysis (such as in the case of [9] and [6]). Methodologically speaking, CEA may assume many forms. In the water area, we come across both simple linear (optimisation) models used for smaller areas and models using mathematical programming, suitable for larger areas including natural conditions. Two different forms of output exist in optimisation CEA models. The EPA [4] distinguishes between the cost minimisation and benefit (effect) maximisation approaches. When minimising costs, the principal goal of the measure is to achieve a given effect with the least possible costs. This approach is applied predominantly. It is used, e.g., by [20] and [13]. Conversely, the maximisation approach aims at achieving maximum possible level of output (effect) using a predetermined budgetary constraint; it is most commonly used for restoration measures. The maximisation approach has been used, e.g., by [1] and [2].

The basic procedure is common regardless of the variable optimised (costs or effect). In the first stage, as shown, e.g., by Whitehead et al. [19], the costs of measures are identified depending on the nature of the environmental problem. Costs can be classified in many different ways. Most common direct costs of application represent the main focus in the whole CEA process. Generally, it is recommended to take into account the most of the potential and known costs. Cellini and Kee [3] show that, for reasons of uncertainty, it is not possible to estimate all costs, therefore efforts should be made to identify and monetarise those that are expected to have the greatest effect. According to [19], the cost valuation should be based on the principle of opportunity costs; therefore, it should also include indirect costs such as social costs. According to Musgrave et al. [15], the direct costs include wages and salaries, costs of equipment and materials, or administration with respect to the type of project; indirect costs are generated as an unintended result of application of measures. Indirect costs are often produced as a by-product, or multiplication and pouring action in areas other than originally intended. The analysis by Galioto et al. [6] is connected with a maximum effort to include costs, ranging from additional costs (investment and operating costs of new measures) to costs arising from decreased profits due to having to implement measures (including the possibility of compensatory payments), social costs (additional taxation to finance measures) and other indirect costs (increase/decrease in other sources of emissions).

Costs can be quantified in different ways. They can be expressed as the total present costs related to a specific period, or as the annual costs in the form of average or annualised costs. In all cases, the costs of individual applications are divided by the effect (for example, amounts of phosphorus reduction in kg) and thus the ratio of cost-effectiveness is set. In the next step, the measures are ranked by their cost-effectiveness ratio. In the case of cost minimisation, the effect of measures is added cumulatively depending on their ranking. When the required size of the effect is cumulatively achieved, all the measures included comprise the most cost-effective way of solving the goal (given problem). As Van Soesbergen et al. [17] note, this basic algorithm of

measure ranking is associated with many complications given by the nature of the measures and the options for combining them. On the one hand, measures may be substitutes, with application of one measure ruling out the application of another. On the other hand, implementation of some measures may be conditioned by adoption of others. The summed size of the effects may be different when combining different measures than when implementing them separately. In the case of measure substitution and using the basic algorithm, the least cost-effective measures are eliminated from the process. With regard to other measures, it may be more convenient to implement a less cost-effective measure that achieves a higher effect (e.g., phosphorus reduction). In this case, it is necessary to apply a more complex algorithm, which is based on the creation of all possible combinations of measures, including both mutually exclusive and sequential measures.

2.2 Introduction of Case Studies

Two complex studies of cost proportionality were carried out in the Czech Republic in the years 2013-2015. The first study was focused on the large catchment area of the Orlík reservoir as a part of the REFRESH international project. The subject of the second study was the small catchment of the Stanovice reservoir. The aim of both the studies was, among other things, to find the most cost-effective combination of measures to reduce phosphorus and thus to achieve "good status" in terms of the Directive. Both the reservoirs are affected by excessive water eutrophication.

The catchment of the Orlík reservoir is located in the south of the Czech Republic. The reservoir catchment area matches that of the Upper Vltava River and covers an area of 12,117 km^2 (representing 15.4% of the area of the Czech Republic) and consists of several sub-catchments. Each of the sub-catchments faces different conditions. The sub-catchments differ not only in their natural conditions but also in the size of cities, methods of wastewater disposal, etc. The reservoir itself is used primarily for power generation and recreational purposes (mainly swimming).

The Stanovice reservoir is situated in Western Bohemia, in the Karlovy Vary Region and falls within the catchment of the Lomnický brook. The catchment of the whole brook covers almost 92 km^2 (representing 0.001% of the area of the Czech Republic). The primary purpose of the Stanovice reservoir as specified by the manager, [16], is supply of drinking water for the Karlovy Vary area, securing of minimum flow rates, and flood protection for Karlovy Vary. Secondary purposes of the water body include electricity generation and fishery, among others. Location of both catchment areas is shown in Figure 1.

Figure 1. Map of Orlík and Stanovice reservoir catchment areas

Source: Authors based on [8]

The main sources of the phosphorus contamination in the Orlík reservoir are municipal wastewater discharged into the watercourses (55% of the phosphorus), intensive aquaculture in fishponds (22%) and agricultural activities in the catchment (11%). At present, fishponds

covering a combined area of approx. 154 km^2 are managed for aquaculture in the Orlík reservoir catchment. There are only 16 small villages and a few ponds in the Stanovice reservoir catchment; therefore, the contribution of phosphorus is distributed evenly between point (municipal wastewater) and diffuse sources (agricultural activities). To prevent massive algal bloom in the Orlík reservoir in the summer, the amount of phosphorus from the identified sources in the catchment has to be reduced by 136 tonnes a year compared to the average for 2007-2009 [18]. Measures are being implemented at present that will lead to a phosphorus reduction by 22 t annually. The inflow therefore has to be reduced by another 114 tonnes a year in the upcoming period. According to information from the T. G. Masaryk Water Research Institute (Výzkumný ústav vodohospodářský T. G. Masaryka), achievement of "good status" in the Stanovice reservoir requires a reduction of phosphorus inflow to the reservoir by 60-200 kg a year compared to the present status. The cost-effectiveness analysis of the Stanovice reservoir calculates with a reduction of 200 kg of phosphorus annually at the inflow to the reservoir.

In the Orlík reservoir catchment, 3097 possible measures have been identified [10] to reduce phosphorus from all three groups of sources (wastewater, fisheries, agriculture); in the Stanovice area, 243 measures for wastewater and agriculture sources [11]. Measures relating to construction and renovation of wastewater treatment plants, sewer systems, dead-end and accumulation cesspits, retention wetlands, biological reservoirs and domestic wastewater treatment plants, and measures relating to intensification of the treatment process at wastewater treatment plants were proposed for the point sources. In order to reduce the phosphorus admission from fishponds it is necessary to change the management, which means notably (i) reducing the populations and thus the fish production, (ii) setting the fodder and fertiliser doses to levels that best correspond to the amount of phosphorus consumed in the fish production (zero balance). It offers two alternative methods to the present way of semi-intensive fish keeping: level-balance production or extensive fish keeping. Agricultural phosphorus inflow measures involve in case of Orlík reservoir catchment 4 types of measures (grassing of 20-metre-wide strips along watercourses and reservoirs, grassing of sloping areas, no fertilisers in sloping areas, introduction of no-tillage methods) and in case of Stanovice reservoir 5 types of measures (building of broad-base terrace, grassing of sloping areas, changes of crop rotation, leaving crop residue, and introduction of no-tillage methods). Table 1 summarises the basic characteristics of both catchment areas.

Table 1. Basic characteristics of the Orlík and Stanovice reservoir catchment areas

Characteristics	Orlík reservoir catchment	Stanovice reservoir catchment
Area	12,117 km^2	92 km^2
Location	South Bohemia	Western Bohemia
Natural and other conditions	Heterogeneous	Homogeneous
Reduction target	114 t/year	200 kg/year
Number of potential measures	3097	243
Types of measures	Point, Fishery and Agricultural phosphorus inflow measures	Point and Agricultural phosphorus inflow measures

Source: Authors

Identification and definition of specific applications of measures and qualification of costs of their implementation are followed by their monetisation based on expert studies, catalogues of measures or a market survey in the form of a non-binding request with contractors/implementers of measures. Annual cost was calculated using the annualised cost method. Known value of present investment, operating and other costs (such as administrative costs, lost profits) are transferred to a future flow of the same costs based on annual costs, which correspond to the known present value when cumulated. First, the present value of costs of the measure or the present value of the component parts of the measure with different lifetimes is

determined. Then, the annualised costs for each component are calculated (Equation 1). The sum of the component annualised costs yields the total annualised costs of the measure.

$$AC = PV \times \frac{i \times (1+i)^l}{(1+i)^l - 1} \qquad (1)$$

Where: AC – annual costs in the annualised form
              PV – present value of costs
              i – discount rate
              l – expected lifetime of the measure

The cost-effectiveness ratio (costs of eliminating 1 tonne of phosphorus) has been determined for the identified measures based on their efficiency and costs. In determining the costs, emphasis was placed on investment and operating costs and lost profits. It must be stressed here that the natural phosphorus retention capacity of the corresponding watercourse was taken into account, so the cost-effectiveness of the measure application expresses the ratio of costs and the phosphorus not discharged into the reservoirs. After we calculated unit costs per kg of phosphorus not discharged into the reservoirs, we could perform the final step of the analysis. The final step of the CEA was ranking the applications of measures by their cost-effectiveness ratios from the cheapest ones to the most expensive ones. A basic ranking algorithm was used in the case of the Orlík reservoir. If some measures were mutually exclusive, the less cost-effective measures were removed from the analysis. A more complex dynamic CEA optimisation process was applied to the Stanovice reservoir, based on combinatorics of all above mentioned measures and on formulation of supplementary measures. The introduction of a more complex algorithm in the case of Stanovice resulted in an increase in the maximum possible reduction to almost 72 kg/year.

3   Results and Discussion

According to the CEA, the total annual costs of all the measures are CZK 602 million (EUR 23 million) for the Orlík reservoir and CZK 1.15 million (EUR 44,231) for the Stanovice reservoir. As shown in Figure 2, point measures formed a significant share of the phosphorus reduction measures in both the catchment areas. The greatest amount of phosphorus in the large catchment of the Orlík reservoir can be reduced in an optimal scenario using fishery measures. On the contrary, only a very low reduction is achieved by agricultural measures. Reduction of phosphorus from agriculture also has a significant impact in the small catchment, because the villages are too small and therefore the point measures are not so cost-effective. The significance of agricultural measures in the Stanovice reservoir catchment is more evident from the comparison of the cost categories of measures (see Figure 3).

Figure 2. Comparison of the reduction ratio of individual categories of measures
(100% = reduction target)
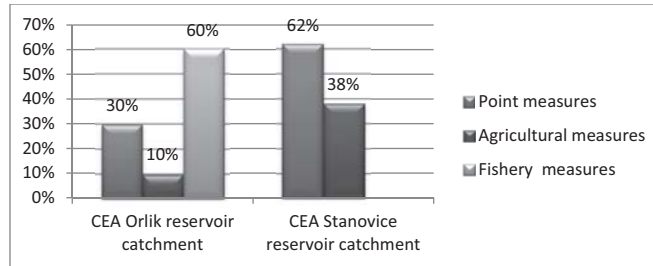
Source: Authors based on [18] and [11]

Figure 3. Comparison of costs of individual categories of measures
(100% = total costs in each catchment)
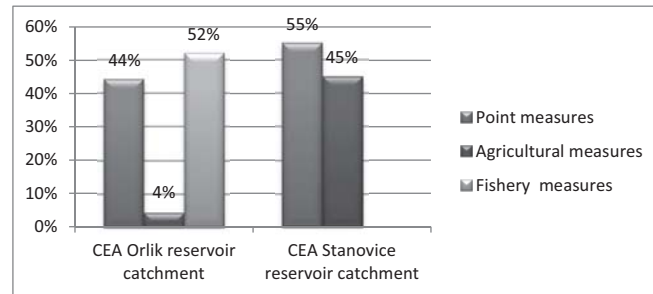
Source: Authors based on [18] and [11]

As a result, the CEA showed that annual costs derived from the phosphorus inflow reduction are significant. The total annual costs of achieving good status (reduced phosphorus inflow in the catchment) are influenced not only by the measure identification process (the categories of measures involved in the analysis), but also the method of ranking the measures. To obtain the most cost-effective combination of measures, it is suitable to apply a complex algorithm as in the case of the Stanovice Reservoir, where all possible combinations and supplements were created. Besides the possibility of achieving lower total costs, it is possible to achieve a higher maximum rate of reduction compared to the basic algorithm. The application of a complex algorithm is associated with greater time demand. It is necessary to determine all possible combinations of measures that are mutually exclusive. In the next step, supplements are specified. In the case of large catchment areas, hundreds of possible combinations of measures as well as related supplements can be identified. In case of the Orlík reservoir catchment, there are more than 3,000 possible measures. In this case, the number of combinations and supplements is estimated at more than one thousand. Therefore, the application of a complex algorithm rises feasibility issues. In many cases, the application of the basic algorithm can be regarded as sufficient. The question remains where it is still proportionate to use a complex algorithm and where not. Nevertheless, even in the case of large catchment areas significant financial savings can be achieved using the complex algorithm. In practical terms, it is much easier to implement several major measures with a relatively large

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effect than a number of small measures. From this point of view it makes sense to apply a complex algorithm in all cases where it is technically possible.

Theoretical definition of small and large catchment areas clashes in practice with the aspects of upstream-downstream. In the case of evaluation of cost-effectiveness in a water body/catchment that is not located in the upper reaches, it is necessary to take into account possible sources of pollution upstream. In these cases, it is necessary to extend the analysis with further measures upstream that will affect the evaluated area. This situation is already evident from the Orlík reservoir example, where measures were considered for the whole upstream area. It is necessary to take into account the natural pollution reduction in the catchment area.

The analysis also shows that there is no single recommendation on which groups of measures are generally the most cost-effective in the Czech Republic; local conditions always have to be taken into account, and measures assessed accordingly.

4 Conclusion

The purpose of the paper was to discuss the appropriateness of the CEA method for selection of suitable measures for reaching "good status" of a particular water body. Based on presented case studies, we have pointed out key methodological and practical obstacles to the method application, particularly considering large catchment areas.

In general, we can conclude that CEA is an appropriate tool for selection of cost-effective combinations of measures for reservoirs or other water bodies. Its rare application in water management, however, confirms the time and resource intensity of the method described above. A possible simplification for better applicability of CEA might include: (a) pre-selection of combinations of measures (to avoid considering all possible options), and (b) creation of artificial sub-catchments in order to decrease the complexity of measures and impacts. Both the steps are likely to simplify the numerical procedures, but also decrease the level of the maximum possible reduction.

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Performance Evaluation
of the Czech Urban Public Transport Companies

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Abstract

Environmental issues, decreasing reserves of oil, and growing population in larger cities are the main reasons for developing efficiency benchmarking measurement models of public transport systems. The objective of this paper is to analyze technical efficiency and service effectiveness of public transport systems in 19 cities in the Czech Republic. In order to evaluate the overall performance, network Data Envelopment Analysis (DEA) was employed. Two inputs (number of employees and costs), two intermediate measures (vehicle kilometers and seat kilometers) and two outputs (number of passengers and sales) were used. The model computes simultaneously technical efficiency and service effectiveness. The data were provided by the Association of the Transport Companies of the Czech Republic. Two companies were identified as technically efficient, another two companies as service effective and only one company (Public Transport Company of Liberec) as overall effective. Finally, information from annual reports of the transport companies (like subsidies from local governments, composition of rolling stock, investment to the new vehicles, etc.) were analyzed to establish possible recommendations, which could lead to better values of efficiency scores.

Keywords: public transport; efficiency; network DEA; the Czech Republic

JEL Classification: C61, C44, R40

1   Introduction

1.1 Transport Policy in EU

It is generally agreed that public transport has to play an important role in a future transport system, because it helps to support environmental sustainability, a good quality of life, sustainability of employment and development. In 1990 the European Commission published a green paper On the Urban Environment, COM(90) 218, dealing with a wide range of problems which urban environments generally were facing. A new White paper on transport policy, which was published in 2001, wanted to initialize a common European discussion, for example to be able to take advantage of the experience of others. The concept of 'best practice' (i. e. benchmarking) is suggested as an efficient tool to benefit from the experience of others [2]. The capacity of people to move inside the European Union has recently been highly increased by the reduction of legal constraints and the simplification of visa procedures. About eighty per cent of European citizens live in urban areas. Each citizen has the choice between different modes of transport. Choice for one or another mode is based on notions such as availability, quality, price and reputation [14].

1.2 Benchmarking in the Public Transport Industry

The core of the concept of benchmarking is obviously the notion of comparison. But to compare is not to benchmark. Comparison is static, but benchmarking is dynamic. In benchmarking, there is the idea of improvement and action.
    Several benchmarking networks, voluntary associations of organizations that agree to share data and knowledge with each other, have been developed internationally. Common

features of these benchmarking networks include voluntary participation by member properties and agreement on standardized performance measures and measure definitions; facilitation of the network by an external organization (a university or a private consulting firm) that is responsible for compiling annual data and reports, performing case studies, and arranging annual meetings of participants; set of annual case studies (generally 2–4 per year) on topics of interest to the participants; confidentiality policies that allow the free flow of information within the network, but enforce strict confidentiality outside the network, unless all participants agree to release particular information; an attitude that performance indicators are tools for stimulating questions, rather than being the output of the benchmarking process. The indicators lead to more in-depth analyses that in turn identify processes that produce higher levels of performance [15].

The European Commission has sponsored several studies relating to performance measurement and benchmarking in the area of transport. The Citizens' Network Benchmarking Initiative began as a pilot project in 1998, with 15 cities and regions of varying sizes and characteristics participating. Participation was voluntary, with the cities supplying the data and providing staff time to participate in working groups. The European Commission funded a consultant to assemble the data and coordinate the working groups. The goal of the pilot project was to test the feasibility of comparing public transport performance across all modes, from a citizen's point-of-view. During the pilot project, 132 performance indicators were tested, which were refined to 38 indicators by the end of the process. The program was expanded to 40 cities and regions [16]. There has been no regular benchmarking initiative in the Czech Republic yet.

1.3 Application of DEA in the Transport Companies Performance Measurement

Need to measure transit system performance along with its various dimensions has led to the development of a large number of quantitative performance indicators. Various researchers have defined alternative goals and developed quantitative measures to evaluate the extent to which transit systems achieved these goals. Unfortunately the individual performance measures yield widely inconsistent results. This leads to the conclusion that a single indicator (or a small number of reliable indicators) is needed to describe transit system performance. Main conceptual aspects as efficiency, productivity, and quality of service were defined by Karalaftis in [10].

From 1950's there have been developing approaches that relate the efficiency of the examined units not to the average but to the best practice frontier created from the performance of the most efficient units. Efforts in this direction have employed two basic estimation approaches: parametric and non-parametric. In both cases technical efficiency is obtained by estimating an individual firm's deviation from the frontier. The fundamental difference of the approaches is the fact that parametric approaches require an a-priori specification of a distribution for technical efficiency and a functional form for the production technology while in non-parametric approach no specification is needed. Stochastic Frontier Analysis (SFA) is widely used parametric approach, whereas one of the most popular non-parametric methods is Data Envelopment Analysis.

The strength of DEA lies also in the fact that it allows using multiple inputs and outputs and does not even require the conversion of these to the same dimension. There are also some drawbacks of DEA. The results may be influenced by outliers and the efficiency scores are relative to the study sample. Both of these problems can be overcome by excluding the outliers on the basis of preliminary investigation or by conducting sensitivity analysis respectively. The next problem of the method is its sensibility to measurement errors and noise in the data, but this can also be solved by joining statistical regression and DEA in a two-stage process, see [11].

According to the survey performed by Rita Markovits-Somogyi [13], the application of DEA in the transport sector is wide-spread, especially in the evaluation of airports, ports, railways,

and urban transport companies. The author has compiled data from 69 DEA applications, investigated their characteristics and the inputs and outputs used. The number of Decision Making Units (DMUs) in DEA applications cluster around thirty, the majority is between 15 and 40. Mostly used models are CCR (under the constant returns to scale assumption) and BCC (variable returns to scale) models. Output orientation is mostly preferred for the evaluation of airports and ports whereas input orientation is more common for the evaluation of public transport organizations and railway companies. The number of inputs is usually around 3 or 4, whereas the number of outputs tends to be 1 or 2. Traditional inputs are labour, capital, and energy. Regarding outputs, they could be ordered into two main categories: operational (the measurement units created from the physical movement of vehicles or passengers and cargo) and fiscal (expressed in some monetary unit).

In the field of public transport, Kerstens [12] applied various variable returns to scale DEA models for the evaluation of French urban transit companies. Hilmola [8] used four different DEA models for around 50 European cities based on the data of the International Association of Public Transport (UITP) database. He found that Bern, Munich, Prague, and Zürich (medium-sized, old cities from central Europe) show frontier performance in all models. Also, common in all high-performing cities was the dominance of rail-based public transportation. Boame [3] performed a bootstrap data envelopment analysis to estimate technical efficiency scores (and also the bias and confidence intervals) for Canadian urban transit systems from 1990 to 1998. The sources of efficiency changes were analyzed by a tobit regression. The main policy implication of the study was the need to improve transit systems average speed and to differentiate the vehicle fleet. Parametric approaches are also used in this application area, e. g. by Holmgren [9], but DEA approach is prevailing.

In her survey, Rita Markovits-Somogyi [13] highlights network DEA approach, as a methodology that is suitable for the evaluation of transport systems making it possible to separate transport efficiency from transport effectiveness. Yu and Lin [19] and Yu [17] apply network DEA to the railway sector while Yu [18] shows an example of applying it to the airports.

The objective of this paper is to analyze technical efficiency and service effectiveness of public transport systems in the Czech Republic via a suitable network DEA model.

2 Material and Methods

2.1 The Model

In the usual notation for DEA models there are considered n decision making units (DMUs) and for j-th DMU ($j = 1, \dots, n$) we denote input vector by X_j and output vector by Y_j. The basic input oriented model for the DMU j_0 under constant returns to scale assumption (I-O CCR model) can be stated as a linear optimization problem to determine weight vectors u, v such that

$$uY_{j_0} \to \max \tag{1}$$

s. t. $vX_{j_0} = 1$

$uY_j \leq vX_j, \ j = 1, \dots, n$

$u \geq 0, v \geq 0$

For the output orientation we have similar problem (O-O CCR model):

$$vX_{j_0} \to \min \tag{2}$$

s. t. $uY_{j_0} = 1$

$uY_j \leq vX_j, \; j = 1, \dots, n^c$

$u \geq 0, v \geq 0$

In both models, the efficiency scores are derived from the optimal values of the objective function and those units, whose efficiency scores are equal to one are assumed to lie on the effective frontier.

When evaluating the performance in general we can distinguish technical efficiency (a transformation of factors to production) and service effectiveness (consumption of production). These measurements are essentially the same for storable commodities because the commodities, once produced, can be stockpiled until consumed. However, technical efficiency and service effectiveness for non-storable commodities, such as transport services, represent two distinct measurements, because one can never store the surplus service during periods of low demand (off-peak hours) for use during periods of high demand (peak hours). To explain this concept, Chiou, Lan, Yen [5] use three performance measures for a public transit system (firstly introduced by Fielding in 1987). They define technical efficiency as the ratio of production to factors, service effectiveness as the ratio of consumption to production, and technical effectiveness as the ratio of consumption to factors as depicted in the Figure 1.

Figure 1. Performance measurements for transport service
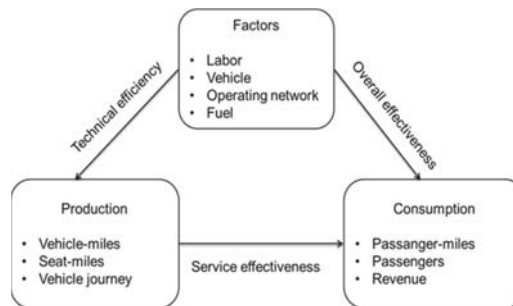
Source: [4]

Some authors derive the scores for the individual stages from the overall score, see [4]. Despotis et al. [6, 7] suggested the composition network DEA approach that computes simultaneously technical efficiency (assuming output orientation for the first stage) and service effectiveness (under input orientation for the second stage), all integrated in one linear program (3). The notation is the same as in the basic models (1), (2) and symbols Z_j, w stand for the intermediate measures and weight vector assigned to them:

$$(vX_{j_0} - uY_{j_0}) \rightarrow \min \qquad\qquad (3)$$

$$s.t. \quad wZ_{j_0} = 1$$

$$wZ_j - vX_j \leq 0, \quad j = 1, \dots, n$$

$$uY_j - wZ_j \leq 0, \quad j = 1, \dots, n$$

$$v \geq 0, \ w \geq 0, \ u \geq 0$$

After solving this linear program, the technical efficiency and service effectiveness scores can be computed by $e_{j_0}^1 = 1/(v^*X_{j_0})$, $e_{j_0}^2 = u^*Y_{j_0}$ for optimal weights v^*, u^*.

2.2 The Data

Public transport in the Czech Republic is represented by the Prague metro, seven tram lines operators, thirteen trolleybus systems, and many bus systems. There is usually one dominant operator in each city. Urban transport service gradually merges with suburban and regional services as part of integrated transport systems. Ecological point of view has become increasingly important in recent years. Trams and trolleybuses are regarded ecological, as well as buses with low production of harmful emissions, e. g. buses using CNG (compressed natural gas) technology. Public transport is usually subsidized by cities. Revenues from fares usually cover from one quarter to one half of the costs. Other sources of financing come from regions, Regional Operational Programs of European Union (ROP EU), labour offices, etc.

The data (see Table 1) collected by the Association of Transport Companies of the Czech Republic (SDP ČR) were used. SDP ČR was established in 1991 and it has 19 members now, especially all the Czech tram and trolleybus operators. The main goals of the SDP ČR are to provide a platform for cooperation, exchange of experience and sharing good practice. A crucial advantage of the SDP ČR database lies in the methodology of estimating quantities such as number of passenger-trips, passenger-kilometers, etc., is the same for all individual decision making units. On the other hand we must be aware of the fact that the DMUs are not entirely homogenous, so the results must be interpreted cautiously considering differences in the rolling stock, population, area, and other characteristics of the cities.

	X		Z		Y	
	Employees	**Costs (10^6 CZK)**	**Vehicle-km (10^3)**	**Seat-km (10^3)**	**Passengers (10^3)**	**Sales (10^3 CZK)**
Brno	2716	2853	37125	4066832	353940	975011
České Budějovice	398	404	5651	564776	38541	123462
Děčín	183	141	3691	265752	8248	48643
Hradec Králové	385	300	5950	475524	34106	118345
Chomutov-Jirkov	239	110	1825	172550	5102	47432
Jihlava	175	122	3032	212255	13777	47867
Karlovy Vary	258	131	2584	225242	9587	58868
Liberec-Jablonec	390	518	7755	680462	42045	195909
MariánskéLázně	31	28	486	34032	3705	10343
Most-Litvínov	446	321	4512	419405	27420	103496
Olomouc	438	364	6196	651153	52193	146783
Opava	184	132	3018	248749	10397	47917
Ostrava	1923	1585	31820	3301825	91000	511306
Pardubice	404	337	5730	557912	25919	117220
Plzeň	821	1308	15077	1437851	101115	292247
Praha	10667	17745	158321	20783067	1329745	4654617
Teplice	263	231	5658	299597	14843	95164
Ústí nad Labem	484	562	7266	733999	43162	186476
Zlín-Otrokovice	331	247	4824	451512	31866	117620

Source: [1]

3   Results and Discussion

3.1 Efficiency and Effectiveness Scores

Table 2 contains DEA scores of technical efficiency and service effectiveness of the 19 Czech public transport companies computed from the model (3) for the data from the Table 1. Two inputs (number of employees and costs), two intermediate measures (vehicle kilometers and seat kilometers) and two outputs (number of passengers and sales) were considered.

	e_j^1	e_j^2
Brno	0.804	1
České Budějovice	0.812	0.828
Děčín	1	0.600
Hradec Králové	0.815	0.847
Chomutov-Jirkov	0.771	0.974
Jihlava	0.931	0.738
Karlovy Vary	0.863	0.906
Liberec-Jablonec	1	1
MariánskéLázně	0.754	1
Most-Litvínov	0.645	0.874
Olomouc	0.861	0.884
Opava	0.961	0.658
Ostrava	1	0.576
Pardubice	0.823	0.764
Plzeň	0.962	0.786
Praha	0.922	0.976
Teplice	0.902	0.861
Ústí nad Labem	0.843	0.941
Zlín-Otrokovice	0.900	0.925

Source: Authors

3.2 The Discussion of the Results

We analyzed the information from annual reports of the transport companies showing frontier performance in the individual stages.

Liberec-Jablonec is the only DMU, which lies on the frontier in the first and also in the second stage of DEA. They reconstructed the tram line between Jablonec nad Nisou and Liberec in 2014 (300 mil. CZK). The cities were joined by the substitute bus lines instead, which was quite demanding for the budget of the cities. They lowered the total amount of the provided services (by 5%) to lower the costs. Finally, the company's economic profit was around 624000 CZK. It was probably caused by the moderate winter and low prices of oil. A negative item is presented by decreasing sales and declining number of passengers.

Brno's network is the second largest in the Czech Republic. It consists of trams, trolleybuses and buses. The most important part is performed by trams. Brno was one of the DMUs with full score in the second stage (service effectiveness). In the first stage (technical efficiency) it achieved value 0.804. According to the results, Brno should try to gain more passengers, which should lead to higher revenues. It should also lower seat-km, i. e. to include shorter vehicles. In 2014, Brno realized a fundamental investment in the CNG area. They built a new CNG station and bought several new vehicles. Brno also reconstructed several tram lines. Brno has been systematically trying to renovate its rolling stock with the emphasis on the savings and ecology, which may be one of the causes of effectiveness in the stage 2.

Děčín has full score in the first stage, but its service effectiveness is only 0.6. Some problems were caused by the termination of suburban traffic contract with the Ústí Region. The company had to lower the staff, nevertheless it ended with a loss of 264 mil. CZK. Some

arrangements leading to higher number of passenger could help to solve the situation (e. g. promotion of public transport in the city). Shorter vehicles, optimization of the network and optimization of personal costs are possible factors leading to lower costs.

Ostrava's results are very similar do Děčín. It achieves frontier performance in the first stage, but its service effectiveness is only 0.576. Build-up area in Ostrava is located asymmetrically. Trams are empty in one direction and very full in the second direction. These facts may constitute the key source of ineffectiveness of Ostrava. According to DEA results, the number of the staff seems to be appropriate, but it is necessary to lower the costs somewhere else - for example shorter (more economic) vehicles can be used. It is also desirable to increase the number of passengers which should lead to higher revenues. There is also a possibility of lowering the subsidy for each ticket, which is considerably high. But it is a question whether it wouldn't lead to a sharp decline of passengers with a regard to an unfavourable situation on the labour market.

Mariánské Lázně achieved full service effectiveness, but their technical efficiency was only 0.754. Their subsidy from the city of Mariánské Lázně was much more lower than in the previous year. It contributed significantly to their economic loss of 5 mil. CZK. It could be helpful to find additional resources of financing (e. g. ROP EU) and to reduce their costs.

Chomutov-Jirkov was very effective in the second stage (0.974), but its technical efficiency was only 0.771. The city experienced a sharp loss of the transport volume, so that they had to lower number of directors and members of executive. They also stopped the programme of the quality certification. They started implementing CNG technology into the public transport hoping for a fast return of the investment. They also reorganized the transit system, changed the line numbers. These changes were not accepted without problems, however finally they have led to a more effective system.

Praha has a largest public transport system in the Czech Republic. The system of trams and buses is the largest in the country. There is also the only metro network in the Czech Republic. It is very complicated to operate such a complex network. According to DEA scores, Praha has very good performace in both stages, but it does not lie on the frontier. This can be caused by the complicated system controlling, which produces additional costs.

4 Conclusion

The network DEA model was used to evaluate technical efficiency and service effectiveness of the 19 Czech public transport operators. Three companies were identified as technically efficient (Děčín, Liberec, Ostrava) and three companies achieved full score in service effectiveness (Brno, Liberec and Mariánské Lázně). Proposed method is able to provide a suitable tool for a prospective benchmarking project, because it helps to reduce the number of performance indicators.

Future research should consist in the extension of the amount of the decision making units. The time dimension could also be taken into account to help to identify the main sources of inefficiency and opportunities for improvement. It is not easy to derive frontier projections for the respective DMUs in network models. Several methods concerning this topic were proposed. However they often yield unrealistic target values for the inputs and outputs of the units, so they cannot be used as a basis for recommendations in practice. Thus another challenge for the future research is to find a proper way how to project DMUs on the effective frontier.

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Funding System of Higher Professional Education in Belgium, Netherlands and Austria

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Abstract

This paper provides a framework for understanding the structure of funding systems for professional higher institutions in selected countries in Europe – in Belgium (Flanders), the Netherlands and Austria. It also delivers a short comparative analysis of their structure, funding sources, student tuition fees and student support systems. Nearly all selected countries already implemented formula funding models for education but offer quite different approaches. Two of the monitored countries address the need for greater funding increase by direct participation of students (and their families) to cover the costs of education. The analysis shows the differences among the countries and describes the situation in each country during the last years. However higher education funding remains primarily a matter for the public sector. The formulas and system of tuition fees can be an inspiration for the Czech Republic.

Keywords: higher professional institutions; public funding; private expenditure; formula funding models; Tuition fees; student support systems

JEL Classification: I220

1 Introduction

The funding of higher education is a much discussed and actual topic in Europe. Today's economic circumstances and financial crisis have resulted into restrictions on public expenditures, which have many impacts into several areas, among others into education. The key problem is to find a way how to arrange that education system can continue to fulfil its role with limited sources. Higher education institutions across Europe face today a threat of critical underfunding which could result into decrease of quality in teaching and also in other educational and research activities. There is a need for finding more effectiveness in setting the system and in running each organisation as well. That is the reason why traditional models of funding have been transformed and continue to evolve. Public sources become more demanding and competitive. In many countries the crisis has intensified public debate about private sources coming from student financial contributions. These discussions tend to focus on the introduction or increase of tuition fees which would help institutions to diversify their income sources and contribute to their overall financial sustainability.

The main aim of this paper is to analyse funding sources of higher professional institutions in three selected European countries and compare their approaches. The analysed countries are Belgium (Flanders), the Netherlands and Austria.

1.1 Professional Higher Education

European higher education institutions (HEIs) can be academically or professionally oriented. Generally, academic higher education is offered by universities and professional higher education is offered by non-university institutions - universities of applied sciences, university colleges, polytechnics, institutes of technology, Fachhochschulen, hogescholen. Terminology in higher professional education is based on national concepts and is generally a product of historical tradition and background. The boundaries between the traditional university sector and the new higher professional education (PHE) institutions are getting blurred [14]. In some

countries the differences between academically and professionally oriented institutions still exist, in many cases all institutions can offer academic and professional programmes. There is no clear and internationally shared definition for the two types of higher education [1].

Higher professional education is characterized by the fact that its study programs are shaped by specific professional goals or needs. It offers a particularly intense integration with the world of work in all its aspects. Its' function is to diversify learning opportunities, enhance employability, offer qualifications and stimulate innovation, for the benefit of learners and society. The world of work includes all enterprise, civil society organizations, and the public sector. For the PHE institutions the cooperation with employers, the use of practice-relevant knowledge and use-inspired research are typical characteristics [1].

1.2 Education Expenditures

Education expenditures are financed by two distinct types of funding: public and private. Public expenditures include all direct funding of education by the public sector, whereas private expenditures include the payment of tuition fees and all other payments primarily by households (i.e. students and their families), businesses and non-profit associations. The need for the government to limit the increasing higher education expenditures is guided by the intention that public resources should be allocated in a transparent way while at the same time offering specific performance incentives [10].

Many countries have developed funding formulas for teaching. Public sources are allocated through performance contracts, single indicators or integrated formulas using a set of measures and criteria. Funding of teaching is therefore based on the number of students and/or teaching outputs, which means that a university receives a certain funding rate for every student. Such funding rates are usually differentiated according to various criteria such as the field of study and level. In [5] the authors define the concept of funding formula as "an algorithm based on standard criteria to calculate the size of public grants to higher education institutions for teaching and/or ongoing operational activity, and in certain cases, research". However, it should be noted there is no single term used to describe the formula-based funding mechanisms because of a wide range of terms co-exist, such as funding per student number, teaching funding formula, unit cost models or formula funding based on normative costs.

Most studies (e.g. [12],[13],[10]) distinguish between input- and output-based models. Input-based funding is the most elemental type of formula funding in teaching as the formula is based on input criteria, such as the number of students or staff. It generally tends to make up for a considerable share of block grants. Output criteria are usually based on performance agreements. Output-based formula funding tends to use various output criteria, such as the number of credits accumulated by students, the number of degrees awarded or the relative success of graduates on the labour market. In [4] it is noted that international studies and reviews indicate that funding formulas in teaching mostly tend to be based on a mix of input and output criteria, whereby the most common criteria used are the number of students enrolled and the number of degree recipients.

Private expenditure on higher education includes the payment of tuition fees and all other payments primarily by households (i.e. students and their families), businesses and non-profit associations. The main forms of student support include these four possible elements:

- grants and scholarships, including specific support for mobility;
- loans, including specific support for mobility;
- tax relief to cover part of the costs of education (tax allowances and exemptions);
- other social benefits (accommodation, meals, transport, healthcare allowances, etc.).

Support is not only channelled to students. Also tax benefits for parents or family allowance play a significant role in many countries. Indeed tax benefits for parents are combined

with grants for students and sometimes (in some countries) loans are also part of the combination.

2 Material and Methods

The main aim is to analyse funding sources of higher professional institutions practiced in Flemish part of Belgium, in the Netherlands and in Austria. The selected sample includes EU countries with a long tradition of higher professional education. All the selected counties are quite smaller, with developed education systems, which can be inspirational for the Czech Republic. Their systems of higher education funding are sophisticated with specific approaches.

Analysing and determining factors of higher education funding systems will primarily focus on formula based funding models for education at public higher professional institutions. We use qualitative and quantitative data including literature findings and statistical data as well as information gained from interviews with representatives of professional higher education institutions in each country studied. Interweaves were used in all described countries in a step of collecting input data and while discussing practical aspects and general situation with people responsible for financial management of HPE institutions. There are no references in the paper, because those consultations only help authors to better understanding the systems. As part of the fulfilment of the objectives of this paper various relevant indicators and data were analysed, derived primarily from the official website of the Eurostat [6], Eurydice [8] and national government agencies responsible for funding higher education in selected countries [1], [2].

2.1 Funding System in Belgium (Flanders)

Belgian education system, and therefore higher education structure too, is specific. As Belgium is a federal state, composed of three Communities (Flemish, French and German-speaking) and three Regions (Flanders, Walloon and Brussels), the constitutional reforms of 1980 and 1989 transferred responsibility for education from the federal state to the Communities. The structure of the educational system in Flanders is therefore different from that in Wallonia. Higher education in Flanders is offered at university colleges and universities. Universities organise the academic programmes, non-university institutions of higher education called „hogescholen"(university colleges) organise the professional bachelor's programmes. Study programmes at hogescholen are divided into one-cycle and two-cycle programmes. One-cycle higher education covers a study period of three years (60 credit points each). The hogescholen organise according law (the July13, 1994 Act regarding HEIs in the Flemish Community) different courses within the framework of eleven so called" studiegebieden" or fields of study. The courses are practice-oriented and include work placements.

Since January 2008, a new model of funding in higher education in Flanders is operational. It includes the whole higher education sector. All public funds to higher education institutions are allocated in the form of a "lump sum" on basis of funding formula consisting of:

- a fixed amount of funding, about 8-to-15%, depending on the size and profile of the institutions, taking into account economies of scale;
- a variable amount for teaching, depending on the output of teaching activity
- Factors are:
- the number of credit points (ECTS) which the newly enrolled students take up;
- the number of credits (ECTS) awarded;
- diploma's: the number of bachelor and master degrees awarded which are converted to a number of credits (one degree is equivalent of 30 credits).

There are weights applied to the study points and the credits related to the type of curriculum [1].

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The student fee has two components: a fixed amount and a flexible part that differs according to the number of ECTS credits followed. A fixed registration fee of EUR 61.90 is paid at the beginning of an academic year. In addition, students pay the flexible tuition fee according to a number of ECTS credits he/she takes up in the institution (at least 54 and maximum 66 credits for one year). Each credit point carries a fee of EUR 9.30. The amount of fees varies with the income of the student and the type of study. For a full-time student with 60 ECTS points the total fee is EUR 619.90. If a student is eligible for a grant, (s)he pays only EUR 0.70 per ECTS point. This means the maximum total fee for a full time student with a grant is EUR 103.90

There is a system of grants from the public purse to support students coming from lower socio-economic backgrounds. Amounts typically range from EUR 253.54 to EUR 3 923.71. However, a student is entitled to an extraordinary grant of up to EUR 5 282.75 on the basis of extremely low income and a lack of support from family members. There is no public system of student-loans in the Flemish higher education system.

Tax benefits and family allowances are provided. Heads of family receive tax benefits which depend on the number of dependent children and other relatives (including students enrolled at HEIs having no income). The tax-free minimum earnings threshold is increased by EUR 1 490 for one, 3 820 for two, 8 570 for three, 13 860 for four and + 5 290 for each subsequent child. Family allowances from EUR 90.28/month depend on the number of children. They are in principle received by the mother of the child while the student is in education or training, until the age of 25. The student should have no professional activity other than a student job during the summer holidays (July, August, September) and work no more than 240 hours per quarter during the rest of the year. However, in case the student is not living with or supported by her/his mother, the family allowance is paid to the parent, relative or legal guardian who actually supports the child [3].

2.2 Funding System in Netherlands

The system of higher education in the Netherlands is built upon two pillars: professional higher education (hogescholen) and academic higher education (universities). Generally, professional higher education is offered by universities of applied sciences and academic higher education is offered by (research) universities.

The Dutch higher professional education system maintains a unique position in Europe, owing to both the size of the professional sector within higher education and the extensive autonomy of the institutions. Professionally oriented higher education in the Netherlands has a relatively strong tradition. In the Netherlands, more than 65 % of all students in higher education study at a "university of professional education". Higher professional education is therefore the most significant supplier of highly educated personnel to the labour market.

The hogescholen offer together full-time and part-time study programmes in seven sectors: education, engineering and technology, agriculture, health care, economics and management, behaviour and society and the arts. The strong practical orientation of the study programmes finds expression in internships [7].

Government-funded universities of applied science are funded on the basis of block grants and certain indicators by which the total budget available to the institutions is attributed to the hogescholen. The overall budget for higher professional education is allocated to the individual institutions on the basis of a set formula. Since 1994, hogescholen have received a block grant, which is adjusted to reflect wage and price developments. In addition, the budget is reviewed each year on the basis of the latest data with regard to student enrolment.

Publicly funded hogescholen receive almost 75% of their total educational budget from the public sources. In addition to government contributions, the hogescholen also generate income from student tuition and services to third parties (average about 5 %).

Tuition fees play a significant role in funding higher education institutions, 18% of the budget of universities of applied science consists of tuition fees. Tuition fees are maximized by the Act on Higher Education (WHW). The study grant and loan system covers the students' costs for the tuition fee. There are no other sources of funding on a regular basis, but it is allowed.

Fees are determined centrally and have to be paid by all students to the institution. There are three types of fee: the statutory fee and the prolonged study surcharge, which are fixed by law, the non-statutory fee which is set by the institution, and the statutory tuition fees, which are charged for a full-time courses (in the academic year 2014/15 amount EUR 1 906). Every student enrolled on an accredited full-time study is entitled to financial assistance. Student finance comes as a mixed funding: it is partly a non-repayable grant, partly a loan and for some students, depending on parental income, partly a supplementary grant. In addition to the study allowance, student finance also encompasses a public transport pass.

A general student "performance grant" is provided by the state to all students under 30 years of age, registered for the first time in an accredited bachelor or master programme. The monthly amounts range from EUR 100.25 to 279.14 paid for 12 months per year. The grants are available for the standard length of a course only – normally four years. Depending on the student's parents' income and whether or not the student lives at home, a supplementary grant, from EUR 239 to EUR 260, may also be received.

For those who have not graduated, the grant is transferred into a loan which needs to be repaid. For those who have graduated grants remain a gift. Only loans have to be refunded. For all that need to refund, the principle is that refunding is only obliged if the income is above a certain level. The need to refund continues for a maximum of 15 years

The students are also entitled to loans to cover living costs (EUR 294 per month) and fees (EUR 293 per month) for a further three years after the standard length of the course. The interest rate is equal to the one paid by the government. The loans bear interest comparable to mortgage percentages and are managed by DUO (Dienst Uitvoering Onderwijs), a government organisation [3]. The number of students entitled to and receiving grants or loans is 69%. This implies that 31% of students do not receive any grants or loans; they are over 30 years of age, not registered for a full time study or registered for a second bachelor or master, of foreign nationality, or have not asked for a grant or loan [8]. There are no tax benefits for parents and no family allowances in the Netherlands.

2.3 Funding System in Austria

Higher education in Austria is provided by 22 public universities (the biggest sector), 21 universities of applied sciences (Fachhochschulen, FH, introduced in 1994), 13 private universities (introduced in 2000), and 17 university colleges of teacher education (Pädagogische Hochschulen, introduced in 2007). Programmes at universities of applied sciences are vocation-oriented. They are provided as bachelor programmes, master programmes, as well as diploma programmes, and include a period of practical training. Universities of Applied Sciences degree programmes may be provided by the federal authorities and other legal entities under public and private law. The universities of applied sciences degree programmes are offered on a broader regional basis than the university programmes. Programmes include: Arts and Design; Business; Cultural Studies and Social Sciences; Police and Military Studies; Health Studies; Natural Sciences; and Engineering [9].

Fachhochschulen are institutions under private law. For the whole sector, a development and funding plan is decided upon between the Austrian federation, states and the Fachhochschul Council. The negotiations are based on calculated student places. The public funding is limited to 90% of the full cost; the remaining part is to be covered by local authorities and business sponsors. This system of mixed funding is based on the standard cost system. The Federal Government bears the costs per study place, provided that the catalogue of established criteria is

complied with. The Austrian Science Council [11] lists four groups of courses and unit costs per student place:

- For students admitted in courses with an engineering content of at least 50%: EUR 7,940
- For students admitted in courses with an engineering content of at least 25%: EUR 6,990
- For students admitted in courses with a focus on tourism: EUR 6.580
- For students admitted in all other courses: EUR 6,510

The professional higher education sector is also predominantly government-funded - this part varies between 60-70 % of the total expenditure, regional sources vary between 22-36 % of the total expenditure. Each federal province or regional authority uses different funding systems – global funding independent of the number of students (eg. Upper Austria - Oberösterreich) or funding according the number of students (eg. Wien, Lower Austria and Tyrol) [2].

There are no tuition fees for students in Austria but providers of the Fachhochschulen are entitled to charge fees up to the maximum amount of EUR 363.36 per semester (for example FH Ober Österreich GmbH has no fee but Fachhochschule bfi Wien GmbH charges the maximum fee). In all HEI institutions, if students exceed the minimum study duration for more than a year, they have to pay EUR 363.36 per semester.

The federal student grants are divided into two sections: direct study financing received in cash, and indirect study financing which the student may receive by a transfer payment to the students' parents, or through non-cash benefits. Direct student support is paid out in monthly instalments up to EUR 8 952 per year. The amount is assessed on the basis of income and number of family members of the student, his/her parents and his/her spouse. The grants need not be paid back except when proof of academic achievement is missing after the first two semesters. Students' parents can receive family allowances EUR 152.70 per month per child and tax relief EUR 58.40 per month per child if the student is under 24 and is studying [3]. There are no student loans in Austria.

3 Results and Discussion

Funding is more than merely an instrument to allocate financial resources to HEIs and students. In higher education, public regulation is related to standards for the quality of degrees through accreditation, to the number of students admitted to public institutions or options to acquire additional resources, particularly tuition fees. The higher education sector in all selected countries is undergoing significant changes not only in access to finance, but also in terms of its structure. Three analysed countries constitute selected sample representing these changes. The higher professional sector is a stable component of the higher education system within the statutory regulation in these countries. Not only in the Netherlands and Belgium, where the sector has a long tradition, but also in Austria, institutions are focused primarily on teaching with limited research activity and a strong link to the business and regional environment.

However, among the countries analysed there are considerable differences. While in Belgium there is a consistent approach to funding teaching activities in universities and professional institutions in the Netherlands and Austria this funding is adjusted separately and differently whereas in the Netherlands this funding is central, while in Austria by involving government, federal provinces, local authorities and providers.

Statutory framework of higher professional sector is therefore reflected in their funding too. The following Table 1 summarizes the comparison of funding mechanism and criteria used in three analysed countries.

Table 1. Criteria of funding formula models in selected countries

	Belgium (Fl.)	The Netherlands	Austria
Criteria used in teaching formula	New entrants; Credit awarded; Diplomas	New entrants; Diplomas	Number of students
Criteria allocation	1.6 Health care, product development	Groups of disciplines with different factor:	Four groups of study fields:
	1.4 Architecture, engin., technol.	1 arts, humanities, law, social sciences, languages	Engineering more than 50%: € 7.940
	1.2 applied language studies	1.5 science, engineering, agriculture	Engineering at least 25%: € 6,990
	1.1 Sociology, business studies		Tourism € 6.580
	1.0 Audio-visual and fine arts, music, dramatic		All other € 6.510
Tuition fees per ac. year	Yes € 619.90	Yes € 1 906	Provider can charge € 363 per semester
Admission system	Open but some regulations	Open but some regulations	Calculated student places

Source: Authors based on [1]

The table contains several interesting facts. In all analysed countries HEIs generally receive block grants (lump sum funding), which means that they have a defined autonomy to decide on the spending of their public resources in their internal allocation. The basic funding mechanism in all countries is formula funding but governments use different approaches to implement formula mechanism in order to fund teaching. Variations concern not only the criteria used but measures and weights for each component too. In Netherlands they have intensive experience in formula based funding models.

In general formula funding means that budget is the product of the number of units and their prices. The number of students is used in all analysed systems but in Austria funding formulas refer to the number of students enrolled (the number of students is limited) while in Belgium and the Netherlands use both input (new entrants) and output performance criteria (number of degrees, number of ECTS credits awarded). The countries analysed use various criteria to distinguish the financial performance of different study programs, i.e. the amount of funding depends on the field of study. Different methods always lead to increased funding for study fields/courses which are costly, especially technical or medical fields.

The levels of fees and support are also extremely diverse across analysed countries. All countries have large share of public core funding. There is the high proportion of the budget coming from tuition fees, even in Austria the student fees are symbolic.

Table 2. Share (%) of tuition fees in selected countries

Country	Tuition and admin. fees per acad.year (EUR)	Annual net earnings in (EUR)	Share of tuition fees	Expendit. per student terciary, % of GDP per capita (2011)
Belgium (Flanders)	619.90	17 206	3.60 %	34.4
The Netherlands	1 906	19 610	9.72 %	36.9
Austria	(726)	16 456	(4.41 %)	36.2
England	11 340	18 694	60.66 %	26.0
Czech Republic	20	4 807	0.42 %	27.3

Source: Authors based on [6]

By simply comparing the amounts of tuition we can observe the differences between the countries. While in Austria, students are not required to pay any fees as mentioned above (but providers of PHE may charge them) there are relatively lower fees also in the Flemish part of Belgium. Students' tuition fees charged in the Netherlands is about three times higher than in Belgium. By calculating the share of tuition fees from the net annual average earnings (single person without children 50% avg.wage), these findings are clearly confirmed (Table 2). We added two other countries with different system of higher education funding and tuition fees – England (as a part of UK) and the Czech Republic. In England the tuition fees are extremely high whereas in the Czech Republic there are nearly no tuition fees (study fees are related only to admission procedures and need to be paid once per cycle). Although there is in England introduced a working system of student loans and other aid and payment is deferred, the question of the adequacy of this high tuition fees and their impact on access to education for all social layers can be discussed (for example the percentage of inhabitants studied at HEIs in 2014 was only 26 % compared to more than 36 % in Austria or Netherlands). The inspiration for the Czech Republic is evident: the underfinanced education sector (only about 4% of GDP makes the public spending on education compared with about 6% in other analysed countries, and the expenditures per tertiary student as % of GDP per capita is also lower than in other countries – Table 2) can be improved by setting tuition fees at public HEIs in the Czech Republic.

4 Conclusion

Many European countries before the signs of financial and economic crises address the mismatch between the pace of expenditure on higher education and the number of students. The ongoing policy debate on higher education budget cuts has compelled an increasing number of states to adopt a funding system based on funding formula. The funding formula follows unit cost approach meaning that budgets are calculated by prices or standard costs required, which should result into ensure qualitative standards in education. There are many differences regarding funding of higher professional education institutions and also several ways how to allocate sources to institutions exist. The analysed countries have already implemented formula funding models for teaching but offer different approaches. Usually the need for greater funding increase by direct participation of students (and their families) to cover the costs of education can be seen. The analysis shows that all analysed countries and their systems try to create a balance between fees and student support. However higher education funding remains primarily a matter for the public sector. On the other hand all systems can be an inspiration for the Czech Republic Ministry of Education.

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Bribes, Tips and Gifts: Informal Payments in Healthcare. Similarities and Differences

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Abstract

The nature of informal payments is not straightforward. The aim of this article is to create a framework that would be helpful in distinguishing informal payments among themselves and from formal payments and corruption. Based on the literature review with combination of content analyses on informal payments we have created 10 indicators by which a comprehensive framework was created. Framework presents similarities and differences among payments. We found out that in 4 of the 10 indicators all payments are different among themselves. We also found out that the gift is so unique that does not match in any of the indicators of the tips and bribes. On the other hand, tips and bribes match in four indicators, which is the highest of all. Based on our analysis, we also conclude that nature of tipping is closer to bribes, than just the symbolic gifts.

1 Introduction

The grey economy in the healthcare sector is formed by so-called informal payments. Although there is a number of studies dealing with informal payments, analysing factors which cause informal payments, and adapting strategies that worked to address these factors, it is often a problem to clearly distinguish between these payments in practice. This phenomenon has a number of definitions and synonyms. Considering all forms of the phenomenon and the thin line between the single payments, there is no uniform definition of informal payments. Scholars are inconsistent on the nature of informal payments, its illegality or relation to corruption.

In addition to the lack of a universal definition, distinguish between these payments, and classification of the informal payments, terminology is also a problem. The identification of this issue is very diverse. These payments are referred to as gratuities or gratitude payments, envelope payments, under-the-counter payments, unofficial payments, under-the-table payments, and many others.

According to [7, p1] informal payments are „*(1) payments to individual and institutional providers, in kind or in cash, that are made outside official payment channels and (2) purchases that are meant to be covered by the health care system*". As [7] continues, these payments are required, not discretionary and are form of corruption. [1] defines them as voluntary payments by a patient to doctor after treatment. In [16] the opinion, these payments are simply payments to government health-care professionals or institutions that just are not sanctioned by the authorities. [2] describes them as patient payments to public health care provider for provision of health care, for health services received or expected to be received, that the recipients of these payments are not authorized to receive. [17] defines them as payments to a health care provider for services, which should be provided at no charge to the patient. [4] describes informal payments as any contribution made in addition to contribution determined by the terms of entitlement to health care providers for services that the patients are entitled to.

Definitions above show discrepancy in perception and definition of informal payments. Payments are perceived as voluntary [1] or just unauthorized [16] to the illegal [2] and corruption [7].

[5] divide the payments into two main groups: donations and fees-for-service. According to authors, donation payments are based on a voluntary basis and conditional on social, cultural, and ethical aspects. On the other hand, fees-for-service are conditional on reciprocal service and are enforced. Based on a systematic analysis of definitions of informal payments in [3], three categories of these definitions are created: informal payments (1) as illegal payments; (2) as unofficial or informal payments and (3) as additional payments on top of any formal payments dictated by the terms of entitlement.

Informal payments often differ from the formal ones only by lack of transparency, regulation, and redistribution. However, informal payments can be barrier to equity and efficiency improvement in the health care system, and can restrict access to health care services [17]. On the other hand, the existence of informal payments, despite the negative impact, may be well founded in certain economies. If the State is not able to adequately fund health care, informal payments can be an important (and only) source for provision of at least some services. In these cases if the only alternative to informal payments is absolute unavailability of services, it is preferred when informal payments virtually cover at least some health services, especially if physicians tailor prices to patients by their ability to pay [4].

The aim of this article is to create a framework that would be helpful in distinguishing informal payments among themselves and from formal payments and corrupt behaviour. The author especially considers perception of tipping as informal payments in health care problematic. This type of payment is usually assessed only from a legal point of view. In practice is therefore incorrectly perceived as a gift. Framework proposed in this article pays more attention to these two types of payments – gifts and tips. We hope that the proposed framework may help to better distinguish between these payments in practice.

2   Material and Methods

Literature shows that to explicitly define the nature of informal payments is not straightforward. Therefore we suggest dividing these payments to certain groups by their characteristics. Our classification is based on the principal-agent model by [14]. Model divides payments into 4 categories: price, bribe, gift, and tip. Gifts, tips, and bribes can be considered as informal payments.

Table 1. Categories of payments

	Quid pro quo	No explicit quid pro quo
Payment to principal	Price	Gift
Payment to agent	Bribe	Tip

Source: [14]

Dividing these payments only by the existence of counter value and the payee is appropriate for dividing of payments, however, for their identification is it considerably simplified. Therefore, we have created a comprehensive framework based on the characteristics of individual payments mentioned above. We focused on seven aspects when assessing payments: the existence of a quid pro quo; voluntariness of paying, economic value of transaction; transparency of transaction; the existence of externalities, state regulation, and the timeframe of making payment. Based on the literature review we consider the following aspects as the most significant to characterization of payments.

The characteristic feature of payment is whether there exists an expectation of (1) quid pro quo. Therefore we focus whether the services or goods are provided for consideration or not.

As a further indicator a (2) rate of voluntariness of payment is included. Indicator specifies conditioning and enforcement of payment for a specific product or service. In relation to the existence of conditioning of payment it is appropriate to observe possible (3) impacts of failure to pay for providing service in the future as the single indicator.

Based on the knowledge of the market economy we have created two separate indicators assessing payments from the perspective of economic value. First indicator pays attention on (4) the value of product and the pricing – whether the price of product is clearly laid down. This indicator monitors the presence of price regulation and traceability of payment for a specific product as well. The second indicator observes the existence of (5) relationship between quality of service and value of payment.

A separate aspect of any transaction is the presence of externalities. Therefore, in differentiating payments a positive or negative (6) impact on other patients by making payment is followed.

Transparency has many determinants. We consider the availability of information on the rules for pricing (as described above), (7) the identity of the payer and (8) identification of the recipient of payment as three most crucial indicators for determining the degree of transparency.

Several tools of public policy can be used for payments regulation. In regulating payments the economic (described above within the perspective of economic value) and legal tools are often used. Act as a legal tool of public policy usually determines the legality of payment in the country. Therefore (9) the regulation by law is one of the indicators.

Among the indicators (10) the timeframe of making payment was included. The indicator determines whether the payment is made before or after the provision of services or is independent of the service provided.

Based on the seven aspects, we have created up to 10 indicators, since some aspects were determined by more than a single indicator. Than we assigned significant characteristics of a particular payment for each indicator. To obtain the characteristics of the particular payment we used methodological approach based on the literature review with combination of inductive and content analyses of the literature on (in)formal payments. More concrete, we used the knowledge of the market economy when defining prices. To demonstrate the characteristics and nature of gifts and tips we used the principles of their use in other sectors, especially Church and services. Finally, we compare the significant characteristics of each payment for each indicator and compare the similarities and differences among payments.

The limit of this methodological approach is subjectivity in the selection of assessment aspects by author. Using other aspects or indicators may lead to different conclusions. The results may be affected by the conclusions of used literature also. The same result is not guaranteed in the case of analyses of different literature.

3   Results and Discussion

3.1 Price

Price is paid to principal quid pro quo. It is purchasing of goods or services, which is often just mediated by agent (e.g. fees are collected by doctors or a nurses in a hospital, but it is not their personal income). The price is paid by concrete patient. The price is also co-financing of the treatment. The patient must pay the price if it is specified so. The price is clearly laid down already before the service is provided and can be regulated by authorities to ensure minimum availability of particular goods or services. After paying the price, the service or product is

eligible. The price is therefore not an informal payment. The principles of paying prices are well known from other sectors.

3.2 Bribe

A *bribe* is a concrete manifestation of corruption. Bribery is always about abusing someone's position for personal or related party's gain by reciprocal and intentional agreement with other entity, regardless of the manner and timing of the transaction when both entities receive some counter value. In this case, bribe is given to doctor (agent), not to state or the insurance company (principal). Bribe is paid by particular patient (or his agent) to particular doctor. According to local the survey [13], for example patients in Slovakia give bribes to ensure better services, to get services as soon as possible, and to not have to wait or to get the best professionals. Both bribery and accepting bribes is illegal. It is defined by relevant legislation. Bribe is considered as illegal and informal payment [3].

3.3 Gift

For gift giving anything in return should never be expected. Gift should not be required. It is a good-will gesture, acknowledgement, or a term of endearment or gratitude [15]. Its value should not be as great as to have a significant impact on provision of any services, or behaviour of donee to the person who gives the gift. The gift is, for example, if a person pays the hospital one hundred thousand Euros for new equipment just because it feels so. This person has no expectation of any return (more perfect services, better access to services, and so on.). It is possible that donee will never use the hospital services. One hundred thousand Euros in light of the total hospital budget will not affect the provision of services only to the person who gave the gift. The possible impact of the gift can be positive also for people who have not given any gifts.

By gift giving donor should not be able to positively affect the behaviour of donee in the future to donor, or negatively to other patients who have not given any gifts. Unlike model used by [14] we note that gift can be given to the agent – healthcare professional. However, it should not be directly linked to the provision of its services and its value should be not great enough to subconsciously positively influence the behaviour of donee to donor. Conversely, gifting could have positive impact on people who have not given any gift (e.g. if gift will be used to improve the quality of services – e.g. modern tonometer for blood pressure measurement).

A matter of giving gifts is better known from personal giftedness between family and friends during pleasant occasions. But donations in health care can be compared to the gift giving in the Church. Symbolic gifts are given anonymously or publicly in church. But not giving any gift by potential donor does not affect the quality of worship and behaviour of a priest to potential donor. The same principle of giving is also known in various public collections for different groups of disabled individuals. Impacts of gift (or amount of donations) could be positive, but never negative for people who have not given this gift.

The gift is an informal, but legal payment. However, in some countries legislation may specify the persons who are not able to accept gifts (politicians, police officers, etc.). We assume that the gifts are given to doctors very rarely in practice, since giving this kind of informal payment in healthcare often follows the provided services. We argue that "gift after service" is not a gift, but just a "tip".

3.4 Tip

A tip is paid to agent with no expectation of anything in return [14]. Tips are supposed to be an incentive/reward for the delivery of good service [11] Studies [10] found out that there is a positive and statistically significant relationship between tip size and service evaluations. Tips are increasing with the perceived quality of service [8]. On the other hand, a same analysis

confirms that this relationship was not so strong. So there is still a doubt that tips can motivate servers, measure server performance, or identify dissatisfied customers [8].

One study found [6], that if a server wants to maximize his tip income, he should serve high quality food in time to regular customers. He also should always remember to smile. This confirms theory [9] that consumers feel some psychological pressure to leave larger tips the better the service they receive. Should be also noted that tipping differs between countries [12]

As we compared gifts, tipping the doctor can also be compared to payments to the priest who performed a certain ceremony. Payments given after baptism, marriage and etc. should be considered as a tip, an expression of satisfaction with the services provided by priest (as agent). But payments raised from collection should be considered as a gift, as there is no connection to services provided in past and no expectation of services provided in future.

According to definitions above, if patient was satisfied with the doctor (as agent) and gave him informal payment (e.g. a bottle of alcohol), while there was no longer expectation of service in return (patient is after treatment), it should be considered as a tip, not a bribe.

A tip can also be accompanied by hidden expectations that each next visit will bring some little benefits (faster reach the examination; the doctor will pay more attention, doctor will be smiling, not grumpy). This can cause psychological pressure on the other patients – what happens if I fail to pay tips? Patient can have the following dilemma about the tipping: If two men regularly go to the same restaurant. A man who always leaves a tip and a man who never does. To which one will be operating staff more accommodating over time?

3.5 Similarities and Differences among Payments

Based on the analysis above, we note characteristics of each payment for each indicator (Table 2). This overview can be used for simple comparison of the significant characteristics among payments for each indicator. As table shows, in 4 of the 10 indicators the payments are different among themselves (quid pro quo; voluntariness of payment by patient; relationship between quality of service and value of payment; impact on other patients).

Table 2. Overview of payments by specific indicators

	Indicator/Payment	Price	Gift	Tip	Bribe
1.	**Quid pro quo**	Always	Never	Can be in future	Always
2.	**Voluntariness of payment by patient**	Involuntary, obligatory, required	Always voluntary	Voluntary but can be expected	From voluntary (bribing by patients) to extorting (conditioning by doctors)
3.	**Impact of failure to pay for providing service in the future**	No impact	No impact	Can have an impact in terms of expectations when providing services again	Can have an impact in terms of expectations when providing services again
4.	**Value of product and the pricing**	Clearly laid down registered and can be regulated	Not regulated, but should be more symbolic	Not regulated	Not regulated
5.	**Relationship between quality of service and value of payment**	Value is fixed	No relationship	Increasing with the perceived quality of service	Related: its value may affect the mere availability of service and its quality
6.	**Impact on other patients**	No impact	Can be positive also for those who do not pay	Can have a negative impact for those who have not paid in the future	Can have an immediate negative impact on those who do not pay
7.	**Anonymity of payer**	It is not anonymous	Can be anonymous, but not necessary	It is not anonymous	It is not anonymous

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8.	**Recipient of payment**	Recipient is principal	Recipient is principal, rarely agent	Recipient is agent only	Recipient is agent only
9.	**Regulation by law**	Always legal	Always legal	Legality depends on the regulator	Always illegal
10.	**Timeframe of making payment**	Before or after the provision of services	Independent of the service provided	After the provision of services	Before or after the provision of services

Source: Authors

For a better comparison of the similarities and differences among payments we have created a matrix of the indicators (Figure 1). Matrix is based on Table 2, where on the upper right corner are presented indicators in which payments differ among themselves and on the bottom left are indicators in which payments are similar among themselves. Figure 1 shows that the gift is so unique that does not match in any of the indicators of the tips and bribes. On the other hand, tips and bribes match in four indicators: anonymity of payer; recipient of payment; value of product and the pricing; impact of failure to pay for providing service in the future. This is the highest match from all payments. According to our indicators, tipping is closer to bribes, than just the symbolic gift.

Figure 1. Similarities and differences among payments

	Price	Gift	Tip	Bribe
Price		Quid pro quo; Voluntariness of payment by patient; Relationship between quality of service and value of payment; Anonymity of payer; Timeframe of making payment; Impact on other patients; Recipient of payment; Value of product and the pricing	Quid pro quo; Voluntariness of payment by patient; Relationship between quality of service and value of payment; Timeframe of making payment; Impact on other patients; Recipient of payment; Value of product and the pricing; Regulation by law; Impact of failure to pay for providing service in the future	Voluntariness of payment by patient; Relationship between quality of service and value of payment; Impact on other patients; Recipient of payment; Value of product and the pricing; Regulation by law; Impact of failure to pay for providing service in the future
Gift	Regulation by law; Impact of failure to pay for providing service in the future		Every	Every
Tip	Anonymity of payer	None		Quid pro quo; Voluntariness of payment by patient; Relationship between quality of service and value of payment; Timeframe of making payment; Impact on other patients; Regulation by law
Bribe	Quid pro quo; Anonymity of payer; Timeframe of making payment	None	Anonymity of payer; Recipient of payment; Value of product and the pricing; Impact of failure to pay for providing service in the future	

Source: Authors

4 Conclusion

The nature of informal payments is not straightforward. Therefore, we tried to analyse gifts, tips, and bribes as informal payments and the price as formal one. Based on the characteristics and definitions of listed payments we have created 10 indicators by which a comprehensive framework was created. Framework presents similarities and differences among payments. Comparing similarities and differences among payments, we found out that in 4 of the 10 indicators the payments are different among themselves (quid pro quo; voluntariness of payment by patient; relationship between quality of service and value of payment; impact on other patients). We also found out that the gift is so unique that does not match in any of the indicators of the tips and bribes. On the other hand, tips and bribes match in four indicators (anonymity of payer; recipient of payment; value of product and the pricing; impact of failure to pay for providing service in the future), which is the highest of all. Based on our analysis, we also conclude that nature of tipping is closer to bribes, than just the symbolic gifts. The limit of this article is a subjective selection of relevant assessment aspects from literature review. Using different bibliography or indicators can lead to different results. The challenge for the future is to make up a comprehensive and sensitive division based on common and distinct features among payments.

Acknowledgements

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Social Innovation Types in Consumer Protection in Alternative Financial Services after the Great Recession

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Abstract

The impact of the Great Recession on many aspects of our societies, politics and economies has become a frequent theme of research; however, there are still many empty spaces left for the study of economically and politically relevant issues. One of these has been the consequences of recent economic crisis for the social innovation patterns of the field of Consumer Protection in Alternative Financial Services (CPAFS). There are several reasons for this focus. First, the field of Alternative Financial Services (AFS) has recently become one of the quickly developing areas of economic life and existing studies suggest that it was the recession which sped up the transformations and innovations in the field. At the same time, the crisis has had a large socio-economic impact on societies and citizens. Given the previous studies on the characteristics and structure of consumers of AFS, we expect that the crisis affected also the demand for AFS, often at the expense of the traditional banking services, and pushed the demand for social innovations in CPAFS. The combination of economic recession, dynamically developing AFS sector and rising demand for AFS from the part of low-income citizens give rise to the question of what major recent types of social innovations may be observed in the area of CPAFS?

Keywords: social innovation; non-profit organization; consumer protection; alternative financial services

JEL Classification: D64, H24, H31

1 Introduction

The effect of the Great Recession [cf. 12] on many aspects of our societies, politics and economies has become a frequent research topic. At the same time there are still many empty spaces left for further analysis of its economically and politically relevant consequences. One of these has been the consequences of recent economic turmoil on the social innovation dynamics in the field of Consumer Protection in Alternative Financial services (CPAFS). The goal of this paper is to identify major (i.e. cross-national) social innovation types present in this field after the recession.

Generally, an AFS can be described as any financial services willingly provided outside the established realm of traditional bank/insurance system. The AFS population is incredibly diverse and there are several factors driving AFS growth and accessibility: they exist in a stream of continual innovation; as technology advances, they find new ways to capitalize on those advances. They are more readily accessible and flexible in their operations and hours, making them extremely convenient. While their fees may seem prohibitive at first glance, in a post-crisis economy where traditional banks tightened their loan restrictions, many AFS providers loosened theirs, making them rather flexible, therefore the fees are not an obstacle to those needing these services. Generally, they are not bound by the requirement for an existing banking system [9]. The field of AFS has thus become one of the most quickly developing areas of economic life and it seems that the recession has impeded a new dynamic in the field in comparison to the standard banking sector [19]. There are two major set of factors behind this.

First, many entrepreneurs were hit by the financial reforms in the standard banking sector and therefore searched for alternative access of capital. Collins et al. [4] list four types of mechanisms here - first, many older citizens were forced to start their company in order to

protect their retirement accounts; second, traditional banks were forced to reduce their risk profiles and thereby limited the access for many entrepreneurs; third, there are still persisting race, gender or other social barriers for many entrepreneurs to access capital; and finally due to social media and web-based applications entrepreneurs seek directly and effectively for funding outside traditional financial institutions. Furthermore, the growing market of AFS [19] attracts more and more established commercial subjects and it is considered by commercial actors as greatly promising area of business, especially in the connection with new digital technologies [8].

Second, the crisis has had a large socio-economic impact on the citizens in general and vulnerable social groups in particular, and limited their access to standard banking services (and resources) [7], [17]. Existing studies point to the fact that AFS are present especially in areas and parts of cities with low income and populated by immigrants and minorities. So called "spatial void hypothesis" suggests that it is the absence of traditional financial institutions in certain locations (related to the social groups that reside there) that leads to more frequent presence of AFS providers [15], [16]. This raises the question of financial literacy of vulnerable groups [13]. These factors in combination with the penetration of new media and communication tools among population contributed to the steep rise in the number of AFS providers and market size of the AFS as the field has become attractive both for existing financial institutions and for new start-ups and entrepreneurs [8].

It is therefore reasonable to expect that given the combination of the rise of economic grievances of citizens in the aftermath of the Great Recession in combination with their massive involvement in AFS on the one hand, and the growing attractiveness of AFS market for new commercial actors on the other, the problem of consumer protection in AFS arises as one of the key political and economic issues [13], [7]. While traditional political actors are focusing on this problem and try to deal with it especially via regulation [18], [20], it has been recognized that many novel initiatives and solutions - sometimes socially innovative ones - have been flourishing from outside the arena of institutionalized politics. We do not restrict our focus to the sphere of public policies but attempt to cover the whole field of AFS including various economic, political and civic actors and institutions. Our research question is: what major types of social innovations may be identified in the field of CPAFS after the Great Recession?

2   Material and Methods

This paper builds on the data and approach to the study of social innovation of the ITSSOIN project [1]. Our study is an exploratory one. We aim at providing an initial insight into the study of social innovations in a specific field of social and economic activity which shall serve as groundwork for more focused future studies. Bearing this in mind we opt for rather non-restrictive definition of the concept of social innovations in order to map the phenomena from the broader perspective. More specifically we follow the European Commission definition of social innovation: "*Social innovation can be defined as the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations. It represents new responses to pressing social demands, which affect the process of social interactions. It is aimed at improving human well-being. Social innovations are innovations that are social in both their ends and their means. They are innovations that are not only good for society but also enhance individual's' capacity to act*" [6, p. 6] see also [1]. In other words, our unit of analysis is the social innovation in the field of consumer protection in AFS in selected countries. We draw on our insights from the analysis of social innovation patterns in the sphere of consumer protection in AFS in three countries - Czech Republic, Denmark and Spain. We structure this chapter as follows: we describe, first, the selection of the countries in the study, and, second, the data collection, analysis and validation.

2.1 Country Selection

When selecting countries for our analysis, we opted for most different cases design in order to maximize the likelihood of recording various existing types of social innovations and to identify more universal patterns of social innovation in the field. The sampling was based on a preliminary European country profiles describing features both directly and indirectly related to AFS field which were elaborated by research teams in particular countries within the ITSSOIN project framework and were based on desk research and policy document analysis (for details see Anheier et al. [2]).

There are obvious differences in terms of social and political development of the three societies that determine overall setting of the field of AFS, as well as in the structure of AFS itself. Denmark may be associated with Social-Democratic setting (even if followed by extensive liberalization since 1990´s) based on the principles of universalism and high level of de-commodification, Spain may be associated with Christian-Democratic welfare state model oriented more towards the principle of subsidiarity and the Czech Republic, where transition from the State-Socialist model quickly took liberalizing turn, may be characterized as the social-democratic model with strong liberal features.

Also the impact of the recession differed significantly across selected countries. In terms of unemployment, as the key indicator of social impact of crisis influencing the behaviour of consumers in AFS, the situation differed both in timing and intensity. According to OECD data [14], Spain was hit extensively (with unemployment rate exceeding 26% in 2013), followed by less extensive impact on Denmark. The last country hit by the crisis was the Czech Republic experiencing, unlike other countries, the drop of unemployment already in 2010 (from 7.3% to 6.7% in 2011). More importantly, the impact of the crisis on the income distribution (inequality, risk of poverty) was also unequal in selected countries [5]. In terms of risk of poverty, the country that was hit the most was Denmark, followed by Spain with relatively less destructive consequences. On the contrary, the Czech Republic experienced the opposite situation, where number of people in risk of poverty even dropped between 2008 and 2009. Furthermore, the highest increase in income inequality of selected countries was detected in Denmark while only slight increase was spotted in the Czech Republic.

Finally, the structure of AFS also differs in selected countries. While all of them share similar historical background, their contemporary structures of AFS differ: while in Spain one of the most important features of the AFS since 1970s were the microcredits provided by the civil society organizations and aiming at helping people in poverty, the Danish case was more oriented towards the system of small and medium sized saving banks that often aimed at incorporation into the traditional banking system. The Czech AFS after 1989 might be described as being driven first by the consumption loans and credits, and later on supplemented by the fast microcredits provided by non-banking commercial subjects with profit-making intentions. The structure of the AFS providers also differs significantly in all countries. While there are some close connections and cooperation between the commercial AFS providers and the third sector in Denmark, the relations between these are blurred in Spain, and contentious or reserved in the Czech Republic.

We identified also some similar features of the three countries. All of the countries aim at more detailed and extensive regulation of the field - either in the form of pressure from the citizens/customers or from the political institutions (which usually follow the opinion of the citizens-voters). This interest in regulation/consumer protection is to a large extent stimulated by existing problems, complexities and deficiencies (cheating practices, new services, lack of transparency etc.) and enabled by the coming of new communication technologies and tools to the field (internet, mobile phones - social networks, new media etc.). However, we do not consider these similarities as seriously limiting the potential of identifying as many social innovations as possible in the selected countries.

The data collection and analysis related to the identification of social innovation types in all three countries were based on semi-structured interviews and content analysis of media. In the first step, the primary list of social innovation patterns was generated during the actor analysis in particular countries where media analysis and first round of expert consultations were employed.

Media analysis consisted of keyword searches in the one nationwide newspapers throughout 2014 ("social innovation") and content analysis of resulting newspaper articles (for details see Brink Lund, Lilleør [3]). Then each country team selected at least three national experts representing and/or having the in-depth knowledge of one of the three key sectors in the field - non-profits (e.g. watch-dogs, cooperatives), commercial institutions (e.g. private or business agencies), and public/state institutions (e.g. regulators, social services providers) and conduct a semi-structured interviews with them (face-to-face or telephone/skype interview). The experts covering the area of AFS provision were briefed on the definition of social innovation (see above) and asked to identify patterns of social innovations in the country´s CPAFS. These methods produced country lists of social innovations. These lists were combined and next round of expert consultations took place. This time, experts with international experience in the field were consulted in order to check existing list of social innovations and asked to add some new if there were any. During September 2015 five experts were approached and asked to identify the most important recent social innovation types in the field of CPAFS. The selection was conducted with regard to the ability of experts to reflect recent trends and potential innovations in different countries. Our selection process was based on the following criteria: great knowledge of particular sector (public, private or third sector), expertise in the field of consumer protection in finance and finally acquaintance with local and international tendencies in the same field. Following experts were selected: a member of the cabinet of European Commissioner for Justice, Consumers and Gender Equality. From the private sector we addressed a Board Member of Provident Financial, s.r.o. From the third sector, we approached a specialist from the People in Need organization. Subsequently, we accomplished to obtain brief relevant information on the topic from one Danish (academia) and one Spanish (public administration) experts as well.

3 Results and Discussion

Following the aforementioned data collection and analysis, we aim at identification of social innovation types in the three countries in the study. It is obvious that these social innovation patterns cross the boundaries of the CPAFS field (e.g. those related to online communication tools or education of the disadvantaged groups) and transform the landscape in many other areas of social and economic life. However as the goal of the paper is the identification social innovation types in CPAFS we analyze and evaluate these types only in relation to this particular field and within it.

Web applications/online initiatives that represent the use of the new (digital) media and communication tools by citizens, activists and their networks aiming at increasing awareness, providing information, and empowering the consumers of alternative financial services were recognized as a significant innovation type. Since consumer protection in finance represents a significant political and economic issue, this type is considered remarkably important due to its ability of provision of consultancy to a large number of clients who may be financially challenged or even face seizures, indebtedness etc., as well as due to increasing awareness of financial products and services by e-learning. This is certainly the case of web portals such as "Distrainor-gets-nothing.cz" (Exekutor-má-smůlu.cz), which helps consumers to stop seizures; "Safe Loan Navigator" (Navigátor bezpečného úvěru) that is an online project helping people interested in a

loan to select secure loan providers from the banking as well as non-banking sectors or "Forburg.dk" public consumer portal that provides clients with consultancy and helps them in the area of rights and complaints in Denmark. These initiatives represent the efforts of non-profit organizations and private companies to guide consumers through the precarious area of AFS. Indisputably, the innovation observed in all selected countries represents a strong tool to strengthen consumer rights.

Financial education is considered another dominant type of social innovations in consumer protection in finance. According to OECD/INFE [13] financial education that has become important complement to market conduct and prudential regulation is a trend, which has led to the development of a wide range of financial education activities in many countries, sometimes combined with the financial consumer protection measures. Such educational activities are usually provided by organizations of the non-profit and private sectors, which often cooperate by jointly forming educational programs. The social innovation type lies here in the raising financial literacy in a population while its importance is recognized especially within projects targeted at certain social groups of citizens such as adults or vulnerable groups (low-income consumers, elderly, minorities etc.) to avoid decrease of their social status as well as on children under fifteen years of age where according to the expert consultations financial education should be provided as a compulsory part of a study program at elementary schools [11]. As a good example of the innovation "Financialeducation.cz" (FinančníVzdělávání.cz) could be brought up. Supported by the Ministry of Finance, this project unites professional associations and other subjects operating in the Czech market with the aim to increase awareness of financial affairs through an educational web.

Another type, which is considered progressive within CPAFS is *Peer-to-peer lending* representing networks that provide users with direct connections to each other in order to trade, share data or exchange information. The innovation here consists of satisfying needs of citizens by enabling them to link with each other without any intermediaries thus enabling providers to offer better conditions to clients than common commercial subjects. This social innovation is facilitated by private organizations, rather than by the non-profit sector.

Similarly, *Crowd-funding platforms* revealing as new actors in the market of AFS were recognized as very dynamic trend based on digital media. Crowd-funding platforms have already been known for a few years in Denmark and Spain; however, it is still considered a very new phenomenon in the Czech environment, without legislation covering this topic exhaustively. Crowd-funding is recognized as highly relevant particularly in Spain where deep economic downturn has changed the perception of traditional financial services in general. One of the best known platforms in Spain is Association of Crowdfunding (Asociación Española de Crowdfunding). An example of a successful platform can be found also in Denmark. Since 2013, Lendino platform has been connecting companies applying for loans together with private investors. On the contrary - according to the experts - in the Czech environment the trend is still subject of distrust facing excess of investors and a lack of borrowers even if it does not lead to seizures or indebtedness of their clients, since online platforms improve the quality and depth of the data used for scoring of clients and identification of credit risk [11]. While platforms focused on charity crowd-funding are usually operated by non-profit organizations, platforms connected to AFS using, for instance, equity or debt-based crowd-funding models, are the domain of the private sector.

Another social innovation type resulting from our analysis is *COOP networks*. COOP as a cooperative, therefore profitable entity, represents retail business networks characterized by certain aspects of social economy. It is valid especially because of provision of various financial and communication services in rural areas, where people do not have easy access to traditional financial institutions and their services. This trend is progressive especially in Denmark, where COOP besides acknowledged as a grocery chain, has run a bank since 2013 [11]. Contrary, in the Czech Republic this type of social innovation attracts only a little attention of the experts.

Timebanking was listed as another social innovation type that may be characterized as a reciprocal service exchange taking place typically among citizens that uses units of time as a currency. The integral part of timebanking is represented by non-profit organizations that interact with individuals as well as businesses engaging their staff in volunteering. This social innovation, which avoids monetary economy and satisfies people's needs without any material currency is not widespread across the Europe. Yet it could be seen as a beneficial innovation especially in the countries with high unemployment where citizens lack sufficient income followed by excess of free time. In the context of the recent financial crisis accompanied by a reduction of consumption and an increase of unemployment, implementation of the innovation seems to be even more interesting since it adds also to community inclusion of vulnerable groups. For instance, such exchanges are particularly strong in Spain [11] within groups of immigrants of different nationalities.

Furthermore, the expert consultations [11] brought suggestions of two other types of social innovations, although without aspiration to high significance. The first, *Provision of non-cash loans only* intended to prevent large number of fraud while providing loans in cash. This shift in the system certainly has an impact on improving the field of consumer protection; however, it represents change in legislation more than a social innovation. Another new type mentioned is a trend known as *Payday loans*. This financial service is recognized especially abroad, while it is viewed to be a new phenomenon in the Czech Republic. The trend rises from private sector rather than the third sector.

Given the listed social innovation types, some discussion over the results is necessary. First, the first two types were largely expected to occur as well as to be listed as significant in all countries under the study, as these represent dynamic tools of consumer protection that help fight information asymmetry, lack of transparency and fairness in area traditionally connected to provision of quick loans and other products of alternative financial services usually provided to citizens without access to services of standard financial institutions. Second, although peer-to-peer lending and crowd-funding platforms are considered innovation types protecting consumers against pitfalls of the regular banking system, they are not understood as the most significant means of ensuring or protecting consumer rights. However, as Collins et al. [4] note peer-to-peer lending and crowd-funding platforms have emerged as a significant funding mechanism and source of capital in recent years. Third, COOP networks and timebanking types of innovations were identified by the experts as the trends with socially innovative potential; however, since they are not fully represented in all European countries, there is limited acknowledgement of these trends by the general public. Moreover, a direct connection to the field of consumer protection is rather weak here. Finally and most importantly, in accordance with actual global trends, the majority of these innovations are operating through new media or even further, they are entirely based on the existence of ICTs. According to the research of Levy et al. [8], financial technology trends are a snapshot of forces currently driving innovation in the market. Digital technologies therefore embody important instrument in the dynamic field of AFS through which a consumer protection is exercised. Generally, we provide the first basic overview of social innovation types in the field without going into much detail. This may help to set the basic framework for further in-depth analysis and to identify the potential candidates for detailed case studies but obviously does not provide us with comprehensive answers about the qualities, conditions or outcomes of these innovations.

4   Conclusion

Our findings reveal that social dynamics in CPAFS is usually closely related both to economic conditions of the country and to traditional banking system. In other words, extent of novel initiatives in CPAFS usually negatively correlates with economic and financial opportunities of citizens (satisfaction of their basic needs, availability of financial resources,

access to mortgages or consumer loans etc.) and with the dissatisfaction with the functioning of an institutionalized financial system. This was clearly the case of many Spanish social innovating initiatives, which arose from the crisis of trust to standard banking institutions and from worsening economic situation during the Great Recession. Even though the Czech Republic was hit by the recent crisis as well (not close to the extent of the crisis in Spain) social innovations emerged rather as a response to unethical practices of non-banking providers and inefficient system of consumer protection in the field of AFS. In the context of radical change that recent financial crisis brought to the market of AFS, eight social innovation types were identified. Five of these were identified in all countries in the study. It seems that at least half of these innovation types is directly connected to (and enabled by) new communication tools and ICT technologies, which makes the aspect of digital media in the CPAFS a key factor to be further validated and explored as it seems that online social networks and new communication technologies have become a new terrain where socially-innovative practices in CPAFS are being debated, formulated and applied. Therefore we propose to identify the major dimensions of social innovation process taking place in the field of CPAFS - these are a) educational and awareness-raising activities, b) focusing on the vulnerable social groups and c) having a significant online character.

Acknowledgments

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Comparison of Health Care Policy among Czech Regions during 2000-2015

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Abstract

Health policy is a broad spectrum of activities across many resorts and involves many actors at different level of government. The health policy at the state level is often analyzed, broadly discussed and compared with other countries. However the regional level seems to be more hidden and considered as less important although regions have many powers due to self-government principles and may affect the state health policy. To formulate and implement health policy at regional level the region needs a personal capacity and political will at least. Hence in this paper we analyze two important circumstances tight with regional health policy during period 2000-2015: (1) personal capacity of regional authorities; (2) Formulation of strategic documents. We assume that 15 years period is long enough to catch and explain some differences among Czech regions. We gathered data about number of officers focused on health matters; regional strategic documents as well as for basic health care indicators. Results shows that a systematic work on regional strategic document partly depends on sufficient personal capacity of regional authorities, but on the other hand there is no link between production of documents and better development of the regions.

Keywords: health care policy; regions; strategic documents; officers

JEL Classification: I18, R58

1 Introduction

The health policy formulated at national level is traditionally considered as important factor for the efficiency of health care provisions, access to the system, quality of provided care, and consequently health status of inhabitants [9]. The role of the regions is considered as important at the field of implementation of central policy and partially decision making about selected issues with local impact [1]. This we assume at least for small European countries with a health care system based on a solidarity principle. The Czech Republic is an example of such country. It is split into 13 regions with 10 mil of inhabitant together; its health care system is based on solidarity principle. However is the role of the regions really marginal in the long term point of view?

To discuss the role of regional health policy we always have to take into consideration the influence of national health policy and the whole health care system [7, 8], the role of the regional president [4] the spillover effects [3] and limited legal or financial capacity for the regions [2]. However regional health policy including health care policy may affect long-term health status of inhabitants [14] as well as affect noticed differences [5]. It would be necessary to introduce a complex model for counting such impact which is out of capacity of this paper. Instead of this we put a focus on comparison of regional activities at the field of strategic planning and health care policy formulation. We assume that long-term activities of regional at the field of strategic planning and formulation health care policy should induce some positive effect in comparison with regions with no health care policy or planning. This idea is described in following figure no.1.

Figure 1. The role of Regional Health Policy
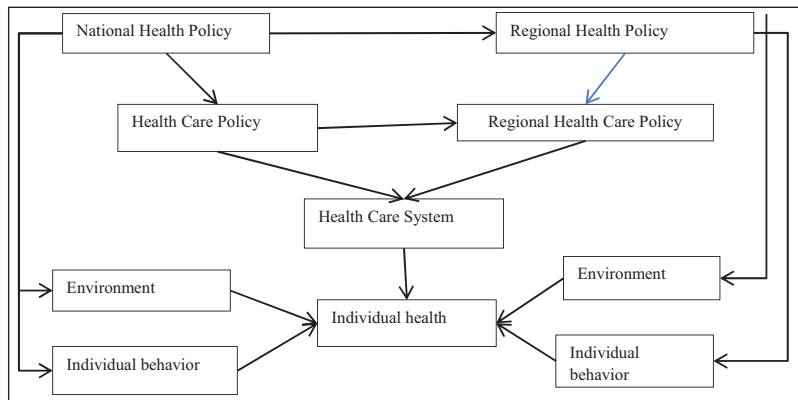
Source: Author

The Czech Republic is suffering by constant changes at the post of Ministry of Health. There were 15 ministers since 1995 to 2015 [16]. They tried to reform a health care system many times but with no or partial results and for a few periods of time there have been no strategies of health policy. The policy formulation at the central level seems to be failing therefore the role of the regions may be more important by this fact and also because competences given by the law.

On the other hand the policy formulation and implementation is complex activity affected by many actors and factors [6]. The results of policy making process could be seen in documents as for example a health care policy plan, a health policy, a strategic plan, etc. A properly formulated document enables chances for achieving appointed goals [12] or may reduce discrepancies among regions [13]. However producing of pages is not guaranty of achieving policy outputs and outcomes, as well as Niskanen [11] pointed to justify their job, officers may produce more than it is necessary.

In this paper we examine activities of the regions at the field of the health care policy formulation and compare it with measurable health policy outcomes. To formulate and implement the regional health policy the region needs a personal capacity and political will at least. Hence we analyze two important circumstances tight with the regional health policy during period 2000-2015 in this paper: (1) personal capacity of regional authorities; (2) Formulation of strategic documents. We assume that 15 years period is long enough to catch and explain differences among regions. There are 13 regions in Czech Republic which are not the same in health care indicators but the same in decision-making power. We tried to find out if there are some important trends' changes among regions in previous three points.

There are two questions behind the aims (1) Is there any link between number of officers and activities at the field of policy formulation? We assume that request for the strategic planning is given by elected councilors' decision but it also can be a result of regional office activities. Anyway number of officers may affect the capacity to fulfill this task. (2) Can we found any positive links between production of documents as policy formulation activity and the development of the region in the case of health care sector? Both questions are serious and their unchallengeable answering is out of possibility of this paper.

As the main methodology we use web research performed in 2006, 2010 and 2015. This long-term data gathering enables a retrospective comparison of currently unavailable data.

2 Results and Discussion

2.1 Relation between Personal Capacity of the Regional Office and Activities at the Field of Health Care Policy Planning

Czech Regions and their Characteristic

The Czech Republic has 13 regions (14 with the capital city Prague) which differ by land size, economic power and other aspects. To provide a brief look into differences we gather a set of basic indicators and show their change during time. To describe trends and differences among regions see table no. 1. Selected indicators demonstrate a diversity of regions through economic performance and health care capacities and these four indicators cannot replace a full comparison. Another important difference among regions consists in different mixture of political parties in Regional representative bodies. Attitude to the health care policy issues may be affected by normative stances of political parties expressed in pre-election programs. This aspect may more important knowing that the regions were in opposition to the Cabinet during almost whole examined period [1].

Table 1. Basic characteristic of Czech regions

	GDP per capita in EUR		Hospital beds per 1000 inhabitants		Inhabitants to 1 doctor		Average duration of incapacity to work (days)	
	2000	2013	2000	2013	2000	2013	2000	2013
min	7 113	11 091	4,99	4,34	245	244	5,7	3,6
max	9 260	15 240	7,36	6,12	341	257	7,7	3,9
median	7 878	13 039	5,98	4,89	300	219	6,6	4,4
average	8 033	12 979	6,18	5,15	298	247	6,7	4,0

Source: Author based on data Czech Statistical Office

The role of Czech regions at the field of policy formulation is not clearly answered question. Regions may be seen as two different actors sharing the same institution. The first actor is the Cabinet servant and it has to fulfil duties transferred by the law. The second actor has an independent decision-making power. While the first role is quite clear the second one is interpreted by many ways. The general role of regions [15] as an independent authority may be described as:

- To care about complex development of the region, inhabitants'' needs and protection of public interest
- To adapt entrusted institutions (e.g. hospitals) to changes in health care system induced by the central level.

Personal Capacity of Regions

Evaluation of a number of officers is always very tricky because the total productivity may or may not correlate with number officers. At the beginning of the paper we set a question whether or not the number of officers is connected with the level of activities at the field of health care policy formulation or strategic planning (or let's say production of documents). We assume that insufficient number of officers may cause insufficient capacity to produce documents requested by councilors. Or we may also assume that relatively higher number of officers may produce more documents as a result of the effort to keep the job.

We are not able to derive optimal number of officers even though regions have same decision making power and the same duties given by the law. Different regional optimum maybe induced by:

- Different preferences of voters or councilors to health care issues
- Different politicians' normative opinion about optimum
- Different economic situation
- Different problems with health care proving especially in the context of management of capacities of health care provides

However we can analyze trends and see whether is there any convergence to some relative number. We use a ratio Number of officers to 1 inhabitant because administrative load induced by the law is connected with number of inhabitants. The table no. 2 below shows changes during the time and we can see some convergence tendencies. The table with more details is shown in appendix no 1).

Table 2. Characteristic of Number of inhabitants to one officer in Czech regions

inhabitants to 1 officer	2006	2010	2015
min	22 168	21 997	29 929
max	106 562	55 941	65 765
median	48 803	36 444	39 896
average	50 367	38 253	42 920

Source: Author

To explain trends we have to mention an economic crisis dated from 2008 to 2013 at least. The backwardness in adaptation of personal capacities is natural attribute of bureaucracy in comparison with market companies. However the tendency of decreasing of extreme values is obvious.

Activities at the Field of Health Care Policy Formulation

The review of activities at the field of health care policy formulation and strategic planning is shown at appendix no 2 and quite extensive differences among regions. Examine period is split into 3 parts 2003-2005; 2006-2010 and 2011-2015. Following table no.3 presents major findings.

Table 3. Review of average

	2003-2005		2006-2010		2011-2015	
	Number of documents	pages	Number of documents	pages	Number of documents	pages
Average value	1,31	78,62	2,23	145,00	1,54	123,92
Average number of inhabitant to one officer	50 376		38 253		42 920	

Note: we estimated pages in the case of missing documents
Source: Author

Methodology

To provide more detailed look; we use a simple score system (see table 4) to show a potential link between number of officers and their activity expressed as production of documents. We check if increasing/decreasing number of officers is accompanied by increasing/decreasing level of activities at the field of health care policy formulation and strategic planning (see table 5).

The score system uses following rules shown in table below. Points are given if the region has a strategic plan or health care policy plan; if the region has some plans for selected issues (i.e. drug prevention policy); if the document contains some analysis of the situation (we assume

that planning without knowing previous situation is not possible); and some extra point are given if the document has more than 50 pages (we assume that the strategic plan, which contains an analytical part and explanatory part for aims setting, cannot be shorter than 50 pages)

Table 4. Criteria of evaluation

	Number of documents is higher than 1	Health care policy conception or strategic plan	Detailed plan for selected issue	Document contains analysis	Document has more than 51 pages	Document contains 0-50 pages
points	5	5	1 per plan	5	5	2

Source: Author

Application of the score system on data about regional documents (appendix 2) and comparing it with data about officers we gain results for all three periods. We count a change from the first period (2005) to the second (2010) and changes from 2010 to the third (2015). We do not attempt to make o correlation analysis or suggest which of these two variables is independent. However we can notice if changes of both variables have a same direction.

Comparison between 2003-2005 and 2006-2010 shows that same direction of change is seen for 11 regions of 13. The result for 2011-2015 versus 2006-2010 reveals 11 case of same direction of changes.

Table 5. Relation between personal capacity of the regional office and activities at the field of health care policy planning

	Documents		Officers			
	change 2005-2010	change 2010-2015	change 2005-2010	change 2010-2015	same direction of changes y.2010	same direction of changes y.2015
Jihočeský	2	1	3	2	y	y
Jihomoravský	19	-12	2	-3	y	y
Karlovarský	-1	-10	4	-2	n	y
Královéhradecký	16	-1	7	-1	y	y
Liberecký	0	1	-1	-1	y	n
Moravskoslezský	3	-9	4	-2	y	y
Olomoucký	5	1	12	0	y	y
Pardubický	7	1	1	-2	y	n
Plzeňský	20	-9	6	-4	y	y
Středočeský	-14	-6	-1	-2	y	y
Ústecký	1	-3	1	-20	y	y
Vysočina	17	0	2	0	y	y
Zlínský	-5	4	1	1	n	y

Source: Author

Analysis of Differences among Regions

Finally the question is if the higher level of production of documents (i.e. activity at the field of health care policy formulation or strategic planning) brings advantages for the region in the long term point of view. Even though many of documents may be focused on technical issues or may be resolve on selected health care agenda the original reason for planning and production of any documents is to improve the situation using resources more effectively. Hence the essential meaning of health conceptions, plans, and documents is to improve people's health. Regions are on independent bodies, they have to respect limits of Czech health care system [10],

but their on activities may affect life style, quality of health care, quality of environment, number of prevention program, etc.

Because initial differences among regions are not huge (see table 6), we also assume that extent of change between 2000 and 2013 can be affected by activities of the region. We choose life expectancy and infant mortality as standard health care indicators. We also add deaths by diseases of circulatory system ((I00-I99) because these deaths are affected by life style (kind of civilization diseases).

Let's assume that extreme values are less desirable than median values if we use relatively expressed variables. If the production of documents would induce some effects it may be seen as faster movement from extreme values to average values.

Table 6. Characteristic of health indicators in regions

	Life expectancy at birth (women)		Death by diseases of the circulatory system per 1000 inhabitants		Infant mortality	
	2013 years at birth	% of change 2000-2013	2000	2013	2000	2013
min	79,00	2,86	4,80	4,64	2,81	1,06
max	81,88	4,61	6,13	5,57	5,87	4,41
median	80,93	3,86	5,57	4,91	4,11	2,54
average	80,88	3,73	5,57	4,99	4,27	2,61

Source: Author based on Czech statistical office

We could assume that regions with initially worse indicators should be more active at least at the beginning of the period. This assumption is based on rationality criteria, but there is no evidence for such behavior. Instead of it we expect, that regions with long term activities at the field of policy formulation could improve their health indicators better. To examine this expectation we compare the development of 2 regions with the lowest production of document with 2 regions with the highest activity at that field (see table 7). Result of such comparison are surprising, "the worst" regions in production of documents showed higher improvement of selected indicators.

Table 7. Comparison of development of the best and the worst region based on criteria of production of documents

	life expectancy at birth (women)	Infant mortality		Deaths by diseases of the circulatory system per 1000 inhabitants	GDP per capita in EUR	Hospital beds per 1000 inhabitants	Inhabitants to 1 doctor	Average duration of incapacity to work
	% of change	% of change	average	% of change	% of change	% of change	% of change	% of change
Average of 2 "worst"	4,21	-40,77	3,06	-15,12	65,58	-17,27	-13,75	-41,97
Average of 2 "best"	3,88	-24,27	4,79	-5,59	52,91	-12,61	-14,36	-40,45

Source: Author

Seeing completely contradictory results than it could be expected (or wanted) cannot be taken as an evidence of truth. We selected only few indicators and use quite simplified approach. Nevertheless if we assume for a while that same result would be gained from deeper analysis, the question appears. Why would regions with fewer documents achieve a better improvement?

We suggest following explanation:

- Regions with higher production of documents
  - may fail at the field of goal setting
    - wrong goals in relation to desired output and outcome
    - insufficient quality of goals formulation (i.e SMART)
    - wrong goals based on wrong results of analysis
    - conflict goals
  - may fail during implementation process
  - are not able force the implementation partly because they "reveal" their intentions to potential opponents
- Regions with lower production of documents
  - May use free capacity of officers to different tasks
  - May use an absence of declared goals as a strategic advantage
- Regional health policy has very small impact in comparison with other factor including national health policy

While we cannot proof positive links between development of region and production of documents we may a put a stress on relationship between production of documents and administrative load to one office (expressed as a number of inhabitants to one officer). The effort to keep the job may also serve as an explanation for higher production of documents. The table no. 8 below brings average results for two "worst" and two "best regions from the production of documents point of view.

Table 8. Comparison of selected regions in production of documents and their personal capacity

	Points for production of documents	Average number of inhabitants to one officer
Average of 2 "worst"	26	58 275
Average of 2 "best"	65	33 203

Source: Author

3 Conclusion

We analyzed 13 Czech regions within 2000-2015 to describe and explain the activity of regions at the field of health care policy formulation in connection with personal capacity of regional offices. Although selected method of analysis has limits we also examined whether regions with initially worse position in health care indicators show more activity at the field of policy formulation.

We find out that increasing number of officers highly probably increase a production of documents respectively increase an activity at the field of health care policy formulation. Unfortunately we did find any proof that there is any connection between production of documents and dynamic of changes of health care indicator. The link more officers equals more documents may be explained by two ways. (1) The effort to keep the job leads to higher production of documents than it is necessary or (2) insufficient number of officer creates an obstacle to work on strategic planning. Seeing no evidence about positive impacts of production of documents on health care indicators we can challenge future research. To formulate stronger statements we have to analyze larger data set of health care indicator as well as perform a deeper analysis of quality of policy formulation process.

Behind this paper and its discussion is one more important question. What is and what should be real role of regions in health care policymaking and implementing. Can an independent activity of region in health care policy brings more benefits (principle of subsidiarity) or may induce more costs?

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Valuation of Externalities Related to Investment Projects in Agriculture

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Abstract

Ministry of Agriculture of the Czech Republic provides subsidies for investment projects of agricultural holdings mainly through Rural Development Programme of the Czech Republic for years 2014–2020. As the finances are public the projects for funding should be selected knowing their social costs and benefits, and hence efficiency and feasibility. For this purpose Costs Benefit Analysis (CBA) is recommended. The projects financed from RDP had not been selected based on CBA before. There is a need to evaluate the externalities related to the projects and establish their prices which will be used when the farmer prepares application for subsidy. The aim of the article is to prepare the methodological field for the valuation of externalities. Requirements for the prices of externalities are set and discussed based on literature review. The prices should be expressed in easily measurable physical units and easy to use and update without too much additional costs. Certain solutions for determination of prices of odour and noise are stated. While for the first mentioned externality a method of preventive costs is recommended, valuation of noise should utilize wiliness to pay and hedonic pricing model.

Keywords: Cost Benefit Analysis; investment project; valuation of externality

1 Introduction

Ministry of Agriculture of the Czech Republic (MoA) provides subsidies for investment projects of agricultural holdings mainly through Rural Development Programme of the Czech Republic for years 2014–2020 (RDP). There are two types of provisions financed from the programme: entitlements and project measures. While the first mentioned are granted to all applicants for a subsidy, only certain projects are selected for implementation. As the finances are public the projects for funding should be selected by MoA knowing their real social costs and benefits. Cost Benefit Analysis (CBA) is recommended method for selection of "large" projects to be financed. CBA became an official method to evaluate the outcomes of structural and cohesion policy of the EU in 2000. Pechrová [7] suggests combining CBA and Data Envelopment Analysis to assess the efficiency of realized projects also from RDP.

CBA measures inputs and outputs in monetary units which is its main advantage and disadvantage. It understands the benefits as every increase of the utility and costs as every decrease of the utility, what is sometimes hard to be determined in monetary terms. However, not all of them have their market price. There are externalities which are created when a company undertakes activities that bring costs or benefits to unsuspecting third parties. „Externalities are defined as benefits or costs, generated as by-products of an economic activity that do not accrue to the parties involved in the activity." [1] Externalities are generated as side effects of an activity that negatively affect the production or consumption possibilities of other economic agents without permission or compensation. In the presence of negative externalities markets tend to fail because producers do not take the negative side effects of their activities into account and make private decisions based on prevailing market prices. When their market prices do not exist, the externalities have to be monetary valuated.

The selections of the applications for a subsidy from RDP had not taken into account complete CBA yet and the prices of certain externalities which are related to the projects are

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unknown yet. Unlike the externalities in agriculture in general (see e.g. [3]), the particular area of externalities generated by the investment projects has not been examined yet. Nevertheless, only having the prices of externalities a sum of net benefits is computed, i.e. benefits minus costs; a positive (negative) sum means that the alternative entails a positive (negative) social profitability. [13] Therefore, the aim of this methodological paper is to prepare the field for the valuation of externalities which can appear in investment projects implemented in agriculture. There is a need to firstly define the requirements for the form of prices and their usage and then to choose the appropriate valuation methods.

2   Material and Methods

Firstly, a list of possible externalities was assembled based on review of investment projects funded from RDP in previous programme period (2007–2013). The most probable were selected according to the frequency with which they appeared in the projects: odour, noise, occupation of agricultural land, pollution of air and water, disruption of biodiversity etc. In this article, we focus on two the most important from the point of view of the welfare of local inhabitants: *odour* and *noise*. We do not take into account the additional *occupation of agricultural land* that investments in new constructions (stables, barns, farm houses) often bring as it is an externality as such. The reason is that its loss (and hence the loss of social benefit in terms of its environmental value) was already valuated by the market. There are fees for the removal of agricultural land from the agricultural land fund. Therefore, it represents internalized externality and the value of agricultural land will appear in financial plan of the project as the costs. Similarly, when the project changes the amount of *polluted water* which is consequently drained into the sewage system its value is reflected in the price of sewerage rates. "When an externality is internalised, the market and government failures have been corrected to the point where economic efficiency has been attained" [1]. To choose suitable evaluation method for air pollution and disruption of biodiversity is the challenge for future research.

Secondly, the requirements for prices of externalities (their form based on the expected usage) are specified. As the paper is of methodological character, the main research method used was literature review of relevant scientific articles and methodical brochures. The requests from regulations of the European Commission and Council were investigated and the requirements for the prices of externalities were listed accordingly.

Finally, the suitable methods for valuation of selected externalities result from the discussion. The overview is displayed at Figure 1. Each method has its pros and cons and provides different results. Both issues are discussed in literature (see e.g. [1]).

Figure 1. Monetary valuation methods

Source: Author

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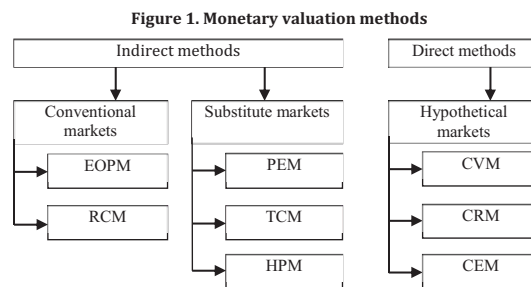
Generally, there are direct and indirect methods of valuation. Direct methods utilize the prices either from conventional or substitute markets. First category includes effect on production method (EOPM), and replacement costs method (RCM). The second contained preventive expenditures method (PEM), travelling costs method (TCM), and hedonic pricing model (HPM). Direct methods utilize hypothetical markets as the contingent valuation method (CVM) asks the inhabitants about their wiliness-to-pay (WTP) or wiliness-to-accept (WTA) the externality. Other direct methods are contingent ranking method (CRM) and choice experiment method (CEM).

3   Results and Discussion

There are certain requirements for the form of the prices of externalities. Firstly, they must be applicable without additional costs to the applicants for the subsidies, because it is not certain that they will gain the grant. The prices of externalities must be expressed in a certain physical units which are measurable. This issue was outlined by Turner et al. [14]: "Generally, "marginal" values rather than aggregated values are required, as the latter do not fit into formal cost–benefit appraisal systems and methods." (In the CBA, we are interested only in the incremental changes – i. e. the difference between null and investment variant.) Besides, the price should be universal, applicable at every type of project (therefore for the same physical units), but particular enough to take into account project specifics. As the program period of the EU lasts for seven years, the prices should be also updated; they shall at least accommodate the inflation (preferably before each call for grant).

The method of valuation depends on the requirements for the price form and its usage. As a result, not all monetary valuations methods are suitable to all externalities. The valuation method should not be too costly and time consuming (this is usually true for the non-market methods). A secondary research is preferred when they are data available. However, there is a problem that most of the studies are done only for specific investment projects or specific situation or location (site, country) and their generalization is very complicated. We suggest not overtaking the prices of externalities from foreign countries (especially when estimated as WTP or WTA) not only because of exchange rates, income level of the households, but also because the people's perception and behaviour differs in various countries. Results must also be recent so the prices of externalities are current. Selected method must be transparent and objective, because the price will be used by public sector for decision-making. The prices of externalities are not robust to the methodology. Therefore, if possible, more methods shall be compared. Then the price of externality takes into account either all prices (average) or one of them.

There are also meta-analysis (comparative) methods which enable to "synthesize in quantitative terms the empirical results obtained from different studies on a predetermined field or topic of research" [6]. "It is an accepted practice among researchers and policy makers to use secondary valuations for new policies by adjusting and applying estimates from primary studies using econometric techniques, known as benefit transfer" [4]. For example the externalities in Forestry-Wood Chains [8] were valued by unit value transfer with adjustments method which builds on the transfer of the actual value estimates from other studies, appropriately adjusted for inflation, differences in purchasing power of income across regions and in some cases also income variation. However, there are certain difficulties related with the application of the method. The case studies must be comparable and appropriate technical research methods must be used (see [6] for extended discussion).

Following sub-sections describes the requirements for the price of externalities and consequent appropriate valuation methods in detail and apply them on selected externalities related to investment projects in agriculture: *odour* and *noise*.

There is a problem with measuring of odour, because its perception is subjective and hardly specifiable. There are methods that can assess the odour in terms of odour annoyance and express it in so-call smell units, but they are rather subjective. For example van Broeck et al. [15] used contingent valuation method in Flemish part of Belgium and questioned a sample of 500 people living near 4 sewage plants and 2 green waste dumps. They found that WTP for decrease of odour per 80% each month a household would pay from EUR 60 to 137/year. According to the review of [4] the WTP of 73 households from 400 potentially affected in North UK for reduction of smell from landfill was USD 0.14–0.22 a day in 1998. A study held in 12 EU countries in 2001 [4] found out that odour and disamenities related to the landfill and incinerator presence decrease the house prices nearby by 3 to 4%/km. More recent study from 2003 [4] showed that the price reduction in house value in UK was about USD 8668 (7%) in proximity of 0.4 km from landfill and USD 2521 (2%) for 0.8 km, for 0.8–1.6 km it was 1.04%, for proximity 1.6–3.2 km only 0.7% and finally 0% for 3.2 km.

However, the price of odour (at least from livestock production) should be expressed in physical units. Objective measuring is difficult especially because odour comprises of several compounds. Odours caused by livestock production arise from a number of gases emitted from excreta and manure, including alcohols, aldehydes, amines, carboxylic acids, esters, ketones, organic sulphides, terpenes, aromatic compounds, hydrogen sulphide (H_2S) and ammonia [2]. It is possible to measure those gases by dispersion studies, but it is costly and non-applicable to the future state of art. When the project is assessed ex-ante the applicant for a subsidy is not able neither to estimate what magnitude of odour would the project produce, neither measure it. Hence, a parameter which is known must be used. We can suggest approximating the odour by NH_3 or H_2S (see Janes et al. [5] who measured the air-phase concentration for these two compounds and investigated them as indicators because of their odour characteristics and ease of measurement). However, this raises a problem with measuring of those quantities. It is usually expensive and time consuming (especially for the farmer) to get the measurement done by an expert. Besides, we must not forget that costs for the subsidy submission documentation are not eligible to be funded. Therefore, other easier measured quantities should be used.

For example the amount of NH_3 produced by the livestock can be calculated to an animal or to livestock unit (LU). The farmer consider the number of livestock in each category which is changed by the project (as a result of a project implementation the number of livestock can change which influence the amount of produced NH_3 and odour) and recalculate it on LU.

The concentration of NH_3 in livestock production is also influenced by used biotechnology. For example in case of milk cows, when the manure is stripped regularly at least 2 times a day the emissions of NH_3 decrease by 15% or when the cattle is stabled on deep bedding with regular adding of 5 kg of straw/head/day, the emissions are reduced by 30%. In case of stabling for sows when the floor is fully slatted with a vacuum system the reduction of emission is 25% lower. There are also biological preparations for treatment of manure and slurry or bedding and feed or water additives which decrease ammonia emissions. Those were examined by Research Institute of Agricultural Technique (RIAT) that elaborated emission calculator available at http://www.vuzt.cz/svt/vuzt/emise.php [9].

The system calculates the annual emissions of NH_3 at listed stationary sources of air pollution in accordance with Annex no. 2 of Act no. 201/2012 Coll., on air protection, category 8 (breeding of livestock with total annual emissions of NH_3 ≥ 5 tons). The program allows calculating of NH_3 emissions for the purposes of categorization of listed emission resources or for the purpose of reporting the total annual emissions of NH_3 with reducing technologies (listed in the Guideline of Air protection department of the Ministry of Environment (MoE) about categorization of livestock in accordance with Act no. 201/2012 Coll., on air protection; to calculate the emissions of these pollutants from stationary sources and a list of technologies that reduce emissions, which were published in the Bulletin of MoE, no. 2/2013). For example 1 milk

cow stabled with bedding generating manure without using any reduction technology (a reference system is applied) produces 24.5 kg of NH_3/year. The calculator enables the farmer to calculate the emissions for all stables in null and investment variants. We suggest approximating the odour from livestock production by the NH_3 emissions as they could be easily calculated without real measurements. Assessing H_2S is more difficult (despite the fact that sulphur-containing compounds were found to have the greatest correlation with odour concentration at pig farms (see [16]) as there is no methodology to recalculate the emissions per LU.

There are also projects for building biogas stations. The nature of odour is different. Because all projects are relatively homogenous varying only by the size and type of the "feed" of the biogas station a special price for odour from those projects should be set.

3.2   Requirements for the Method of Valuation of Odour

The price of odour should be objectively expressed in CZK/LU. For this reason a *preventive costs* method is recommended for monetary valuation. The amount of produced ammonia (used as a proxy for odour) in livestock production depends on the technique and technology used. Valuation of the ammonia can be done by the costs for the additives. Each category of livestock has different approved biotechnology for emission reduction. The lists of preparations can be found at RIAT web pages: http://www.vuzt.cz/index.php?I=A138 [10]. The information about the magnitude of emission reduction, dosage and method of use, and price of the preparations enable to calculate the price of NH_3 emission in terms of the costs on preventive measure for reduction of NH_3/kg/year in certain livestock category. The farmers calculate the emissions for certain category of animals in null and investment variant of the project (taking into account the measures for emission reduction) using the on-line calculator of RIAT [9]. Then they multiply the incremental amount of emissions for certain livestock category with the price of NH_3 in the same category and get the price of the externality.

Contingent valuation method might be used to set the price of odour from biogas stations. Researchers and experts are not agreed on whether or how much the biogas station smells. Therefore, the perception of people is more appropriate to be taken into account. The local inhabitants living near the biogas stations should be questioned about their WTP for the presence of the station or WTA the compensation that the project was implemented there. The price should be set based on the question whether the biogas station is present or not. A sample should be chosen to represent biogas stations of various parameters: size, type of "feed", distance from the nearest municipality etc. Than the table of prices taking into account those features can be elaborated. The smaller is the biogas station and the further is the municipality, the lower is the price of the externality. Various types of "feed" should be examined separately.

Table 1. presents model example of the price for odour with regard to the distance from the project site. To the best of our knowledge, there has been no research done in the area of wiliness to pay for biogas station's odour reduction by local inhabitants in the Czech Republic. Therefore, model price (from the research of van Broek et al. [15]) is used. We assume that one household is WTP EUR 25/year for the odour reduction; this amount to CZK 745/ household (2005 average exchange rate) and CZK 186/person (household with 4 members) a year.

Table 1. WTP for decrease of *odour* from biogas station with regard to the distance

Distance from the project site to the nearest municipality	WTP/person influenced by the project	Percentage of initial WTP
at the site	186.00 CZK	100.0%
≤ 100 m	130.20 CZK	70.0%
101 m - 500 m	106.95 CZK	57.5%
501 m – 1000 m	65.10 CZK	35.0%
> 1000 m	18.60 CZK	10.0%

Source: Author

Consequently, the applicant for a subsidy can calculate the price of the odour as showed in Table 2. There are only two variants: null – no biogas station is built, investment variant – it is. Than the applicant declares the distance to the nearest municipality and the number of people living there who will be influenced by the project (it is a subjective guess which should be argued in the documentation). The odour is not durable – we can assume that biogas station can smell for example 2 days a month (24 days a year). Hence, the recalculated coefficient per day is 0.07. Finally the price for odour from biogas station would be CZK 456 per investment project.

Table 2. Model calculation of *odour's* price

Variable	Value	Units
Distance from project site to nearest municipality	1	km
Rate**	65.10	CZK
No. of influenced people (in the nearest municipality)	100	---
Odour price	6510	CZK
Duration of odour	0.07	of day
Total price of externality*	456	CZK

*Will be calculated automatically. ** Will be taken from Table 2.*
Source: Author

3.3 Requirements for the Price of Noise

Similar measurement problems as in case of *odour* appear with externality *noise*. Subsidised project can cause an increase of noise level by certain quantity of dB. However, in previous studies there are not often the prices for noise expressed per 1 dB, but more likely as wiliness of inhabitants to pay or wiliness to accept money for being annoyed by noise for certain period of time. Sieber and Melichar [12] applied contingent valuation study in order to estimate willingness-to-pay (WTP) of locals for the reduction of traffic noise by 10 dB (from 70 dB up 60 dB). The value should be as objective as possible and take into account parameters of the noise – duration, type of the source of the noise and the distance to the nearest populated areas, but be universal and easily applicable on various types of projects. There are other issues related to noise – its duration (permanent, short-term, long term) and type (from traffic, biogas station, technology installed in stables, etc.) can influence each individual differently according to his or her perception of noise. Therefore, average unit is used – in the United States the environmental noise is frequently assessed by means of the day-night average A-weighted sound level, in the European Union is used the day-evening-night average sound level (abbreviated DENL) [11].

Let's consider that people are WTP 220 CZK for decrease of noise by 10 dB (see [12]). Then the marginal value would be 22 CZK/dB of decrease. We may generalize the value also to the increase of noise. This value applies for direct, close, continuous noise. With increasing distance, the WTP price will decrease accordingly. For setting of the decrease rate, a hedonic valuation method can be used. We can assume that the WTP price will decrease in the pattern that further the people live from the source of noise; the less they are WTP. For modelling purposes it is assumed that the decrease is linear: up to 100 meters, people are WTP 70% of the initial price, than from 101 m to 200 m 65%, 201 m to 300 m 60% of initial price etc. Simplified calculation (using average monetary weights for given intervals) is displayed in Table 3.

Table 3. WTP for decrease of noise by 1 dB with regard to the distance

Distance from the project site to the nearest municipality	WTP/person influenced by the project	Percentage of initial WTP
at the site	22.00 CZK	100%
≤ 100 m	15.40	70.0%
101 m - 500 m	12.65 CZK	57.5%
501 m – 1000 m	7.70 CZK	35.0%
> 1000 m	2.20 CZK	10.0%

Source: Author

The applicant for a subsidy calculates the price of the externality as modelled in Table 4. Noise in null and investment variant will be taken from technical documentation and the difference calculated automatically. Then the applicant will declare the distance to the nearest municipality and the number of people who will be influenced by the project. When we suppose that the noise will lasts for example half a day, the final price will be divided by half.

Table 4. Model calculation of *noise's* price

Variable	Value	Units
Noise null variant	45	dB
Noise investment variant	42	dB
Noise change*	-3	dB
Distance from project site to nearest municipality	3	km
Rate*	2.20**	CZK
No. of influenced people (in the nearest municipality)	2300	---
Noise price*	5060	CZK
Duration of noise:	1/2	of day
Total price of externality*	2530	CZK

*Will be calculated automatically. ** Will be taken from Table 4.*
Source: Author

3.4 Requirements for the Method of Valuation of Noise

Noise level is usually stated in the technical documentation of particular technology. The difference between null variant and investment variant could be calculated and the price of noise per 1 dB will be taken by the farmer. There had been many studies done in the area of noise valuation. Mostly, they consider the traffic noise. Nevertheless, the annoyance by noise cause to the local people is similar despite the source of the noise. People are disturbed in their daily activities and are WTP for decrease of noise or WTA the compensation. Because of the numerous research held (also in the CR), we suggest exploring them and use the most similar to set the price of noise from investment projects.

4 Conclusion

The aim of the article was to prepare the field for the valuation of externalities caused by investment projects financed from Rural Development Programme of the Czech Republic for years 2014–2020. As only efficient and feasible projects should be selected for funding, Costs Benefit Analysis (CBA) was recommended to calculate the all costs and benefits of the projects (including social ones). The investment projects had not been selected based CBA before; hence, the government (particularly the Ministry of Agriculture of the Czech Republic) had to prepare the methodology for evaluation of the externalities in the projects submitted by the farmer.

The prices of externalities should be expressed in easily measurable physical units and easy to use and to be updated without too much additional costs. They should also be universal, applicable at every type of project (therefore for the same physical units), but particular enough to take into account project specifics. In case of odour from livestock production the price should be set per 1 kg/NH_3/year. Odour from biogas stations shall have the price fixed per project based on the distance from the nearest municipality and number of influenced people. Noise price (different for the noise from traffic and technologies) shall be determined per 1 dB.

For the determination of the price per 1 kg of ammonia per year a preventive costs valuation method is recommended. Price of odour from biogas station should be set based on contingent valuation method. Valuation of noise (especially from traffic) should utilize the results of previous researches. There have been many of them done using contingent valuation

methods or hedonic pricing models also in the Czech Republic and could be used. For example results of [8] estimated average value of disamenities (including odour and noise) per kg of waste for the Czech Republic to EUR 0.0019 (corresponding to CZK 0.0562, CZK/EUR exchange rate 2005). The challenge for future research is to choose suitable evaluation method for air pollution and disruption of biodiversity.

Acknowledgements

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Fight against NGO Inefficiency: The Use of Financial and Impact Management Tools in the Czech Republic

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Abstract

Impact management uses tools that should help to make the activities of organizations more efficient. The main interest in impact management is in the public sector because it involves a great amount of public money. The principles of impact management can also be important in the nongovernmental nonprofit sector because of the absence of a profit mechanism, nonprofit goals, and public goods, and the presence of public money in form of grants. This paper was inspired by the German study "Wirkungsorientierte Steuerung in Non-Profit-Organisationen" and is intended to offer similar insights into the practices of nongovernmental nonprofit organizations (NGOs) in the Czech Republic. We investigated the extent to which various financial management tools and impact management tools are used in the Czech Republic, a transformed economy where setbacks in modern tool implementation are expected. The presented results are based on data obtained from interviews and questionnaires from NGOs operating in Brno, a town in the South Moravian region of the Czech Republic. The data indicated that developed financial management was more common in larger organizations, but that impact management was virtually unknown, with impact management tools only rarely seen.

Keywords: non-profit sector; management; impact assessment; social impact

JEL Classification: A13, L31, H39

1   Introduction

The national economy can be divided by Pestoff's [15] criteria (financing, property and formalization) into the governmental (public) nonprofit sector, the nongovernmental nonprofit sector, the nongovernmental for-profit sector, and the household sector. Some form of management is necessary for each of these sectors. The purpose of this paper was to describe the use of particular types of management, specifically of financial and impact-oriented management (see below), by selected organizations active in the nongovernmental nonprofit sector. According to Salamon and Anheier, these organizations have some shared features: they are organized, private, non-profit distributing, self-governing, and voluntary [17]. Financial management can be seen as the dominant management task, focused on all of the economic ties of an organization [9], including basic activities such as financial planning, financial decision making, financial operations management, financial analysis, and financial control [10]. These activities are important for acquiring financial capital, contributing to its suitable allocation and usage, reallocating financial gains, and recording and analyzing financial processes.

Financial management can be seen to varying degrees in each formalized sector of the national economy and in organizations that function in these sectors. The nongovernmental for-profit sector develops and maintains financial management tools that are used regularly over the long term and are very important for management. This sector is considered to be a source of inspiration for the other sectors (see e.g.: Su, Nuryyev, and Aimable, 2014; Greenlee and Trussel, 2000; Chabotar, 1989).

Opposite the nongovernmental for-profit sector are nonprofit sectors with organizations targeting different goals oriented on a public benefit [20]. These present different dangers and challenges for decision making and for measuring results, because profit is not

an appropriate indicator of success for them. Nevertheless, many other indicators and measurements of success that are useful in the for-profit sector can be used in the nonprofit sectors to acquire better results in efficiency, effectiveness, and economy [13]. Whether the resources of these organizations are well spent can be determined using new tools and indicators that measure their impact on the well-being of stakeholders, citizens, or members; this is generally called a "social impact". The tools are called impact assessment tools or impact measurement tools (for our purpose in terms of synonyms). In this paper, the activities related to the implementation, usage, and evaluation of impact are called impact management or impact-oriented management. The tools and activities of impact management often consume large amounts of resources and time, and the results are often imprecise. Even so, it is generally thought that nonprofit sectors should use at least some impact management tools in order to be as efficient as possible, even without profit as an indicator [3, 4, 5, 19].

Social impact assessment is the research subject of plenty of organizations such as IAIA (International Association for Impact Assessment), SVI (Social Value International), SIBG (Social Investment Business Group) and many others. Such organizations quite often offer own methods, guidelines, or even certificates for assessing social impact, e.g.: TRASI (Tools and Resources for Assessing Social Impact) or SIA (Social Impact Assessment). Those organizations usually makes a profit by research and business with new methods of decision making process for NGOs, public sector, or even private sector in the field of social and environmental impact. In some countries, certificates could be connected to government policies of organizational financing and support [7, 18, 19]. Besides those organizations, research of social impact assessment is also carried out by academics.

Freudenberg described social impact assessment with its connections [8] to big investment projects and decision making process. He also predicted further development of impact assessment tools. Burdge and Vanclay described the state of the art of social impact assessment with all definitions and agreements [4, 8]. They considered social and environmental impact assessment as integral part of precise decision making process. Other authors like Becker [3, 8] had followed their studies. After 2000 the social impact measurement becomes more often connected to NGO sector. Moody, Littlepage and Paydar wrote about usefulness of SROI (Social return on investment method) for decision making in philanthropic field [8, 14]. SROI become one of well-known methods [2, 8, 12, 14]. Currently, social impact assessment is important field for all formalized sectors and variety of organizations promotes impact assessment and usage of methods and manuals [23].

Based on the literature review, we accepted assumption that methods of financial management and social impact measurement are useful tools for maximization of efficiency and usefulness of activities in NGO sector. Tools of financial management were researched as necessary condition for proper usage of social impact measurement tools.

One study focusing on the use of financial management tools and impact assessment in the NGO sector was "Wirkungsorientierte Steuerung in Non-Profit-Organisationen", published by Albrecht, Beck, Hoescher, and Plazek in 2013 [1]. The authors were generally concerned with indexes and criteria of success in NGOs and on the possibilities and necessity of tools of financial management and impact assessment in NGOs. The criteria for success were divided into categories: impact indicators (e.g. satisfaction of the target group, quality of services, and improvement in social problems), financial performance indicators (e.g. development of annual turnover, equity, donations, budgeting, and cost accounting), and others (level of awareness about the organization, development of image, satisfaction of the collaborators, and market share).

As in the "Wirkungsorientierte Steuerung in Non-Profit-Organisationen" study, we prepared analogical insights into the usage of financial management tools and impact-oriented management in the activities of the Czech NGO sector.

2 Material and Methods

The original German research was based on a survey of executives and leaders from 83 economically large organizations (turnover higher than 1 million EUR) active in social services.

We partly adopted the same frame and questions of the original survey for the Czech environment. We used this survey to investigate a uniquely Czech form of NGO, called public benefit corporations, because they were very similar to the original German sample in terms of their activities. Public benefit corporations exist in a variety of areas of activities offered to households. We limited the sample to organizations headquartered in Brno, the second biggest city in the Czech Republic (the biggest city without special status of capital), a total of 163 registered public benefit corporations. That sample offered a reasonable basis for insight into the topic representing standard Czech public benefit corporations. The representativeness of the research is thus limited to public benefit corporations in Brno.

We expected a less-developed culture of financial and impact measurement in the Czech Republic than in Germany. The sector suffered setbacks under communism and the adoption of new tools and methods from western countries was delayed. This matters particularly in public administration, where impact and quality management tools have been an issue in recent decades, sometimes with pressure from the European Union in its efforts to modernize public administration in its member countries. In general way, we wanted to confirm or reject thesis (based on the setbacks) that tools of financial and impact management are in the Czech Republic used only scarcely or are completely unused.

We completed 23 questionnaires from 85 operating organizations (approximately a 27% return, the rest of operating organizations was unwilling to participate because their workload). The other organizations in sample were not active or were in liquidation (the rest from 163 registered). The small share of registered and still active organizations was very surprising. The questionnaires were completed via telephone interviews and personal visits conducted by students.

The questionnaire was not an exact copy of the questionnaire used in the German study. We prepared a simplified version. The questionnaire had three parts: basic information about the organization (activities, employees, and financial structure); an overview of the financial management (general usage, financial planning, budgeting, and use of basic financial ratios and indicators); and the evaluation of organizational impact (existence of strategies, knowledge about impact assessment, general usage, and use of selected methods). The whole questionnaire was accompanied by explanation of the used terms.

The second part of the questionnaire was inspired by Vaceková's thesis [21] and an articles [11] and [22] presenting the basics of financial management. The social impact assessment section was based on the approaches of the Social Impact Analysts Association (SIAA) [19], social impact assessment manuals [7, 18, 19], and experience of the authors. More detailed information about the questions is presented in the study results.

The study used descriptive statistics to demonstrate financial and impact management in Brno NGOs. Questionnaire results are presented in charts and tables, with accompanying author comments presenting conclusions based on the qualitative processing of commentaries and the notes of interviewees and interviewers.

3 Results and Discussion

We collected responses from 23 organizations active mainly in the fields of education or social services (nine of each). Other organizations were active in health care and leisure activities (three of each). Other fields of activity, such as the environment, religion, housing, and legal protection were reported by one or by no organization. Viewing the number of employees and the income amounts, the share of small organizations was dominant (35% of

organizations had between 1 and 5 employees; 26% did not have an annual income higher than CZK 100,000, approximately EUR 3,700). The income structures varied significantly, but most of the 23 subjects followed the national model for nonprofit financing (39% of organizations is financed from grants, 30% by revenues of non-profit activities, 18% by private donations...) [16].

The second part of our research focused on financial management, which was practiced in 15 of the 23 organizations (65%). These organizations employed professionals and had greater financial backgrounds (annual returns higher than CZK 1,500,000, approximately EUR 55,300). Financial management was very important for these organizations (80% of respondents had implemented financial management); the other organizations expressed that financial management was important for them to a lesser extent. Financial management was connected to a concrete person, usually the head of the organization for smaller subjects, or a financial manager or economist for bigger NGOs. Of the 15 subjects practicing financial management, 14 used financial accountants in the same way as in the for-profit sector. This type of accounting enables organizations to use a broad range of financial management tools.

The process of financial planning plays an important role in an organization's financial management. Short-term financial plans (for less than 1 year) are really important; 14 subjects reported making such plans regularly. Mid-term financial plans are used less often and more irregularly, by 6 subjects regularly and by 6 subjects irregularly. Long-term planning is not used regularly, and only 4 subjects use it irregularly.

The organizations used different budgeting methods. One organization did not use budgeting at all anymore (for bigger NGOs unusual but pretty typical for rather small ones). The other organizations used at least one and often more than one budgeting method (approximately two thirds of the organizations used more than one budgeting method). There were no connections between budgeting methods and other organizational characteristics. The frequency of budgeting method usage is illustrated in Figure 1. The "other" category includes "cash flow analysis", which is quite similar to the "liquidity ratio" financial performance measurement tool (see below).

The next section of questions focused on the usage of financial performance measurement tools and indicators. Only a few organizations reported significant usage. Two organizations used most indicators (profitability ratio, liquidity ratio, debt ratio, and activity ratio); others used some selected tools or no tools at all. The use of selected and limited tools was probably connected to concrete projects or activities involving the organizations. Figure 2 shows the frequency of use of financial performance measurement tools. Cash flow management is included in the "other" category again. When asked why financial management was not used, almost half of the organizations reported that it was not necessary (46% of organizations without financial management), others gave other answers in equal share: insufficient capacity, insufficient knowledge, and others; 18% for each answer. A tight link between financial management and success in grant management was revealed in the "other" category. The respondents reported the necessity of using financial management after receiving grants and the redundancy of financial management in the absence of public support.

Figure 1. Budgeting Methods
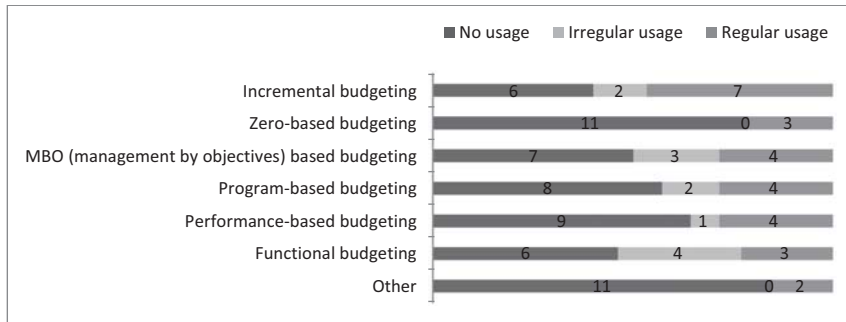
Source: Authors

Figure 2. Financial Performance Measurement Tools
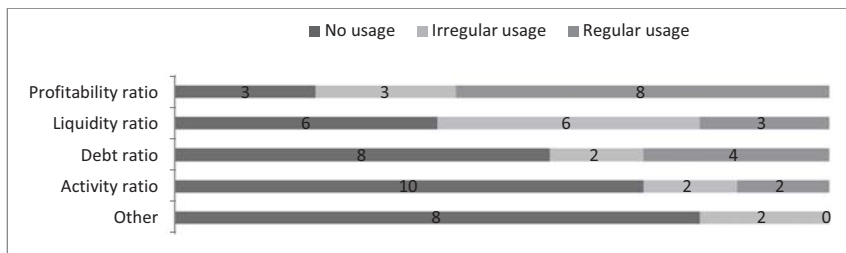
Source: Authors

We considered impact management to be another level of NGO management, based on accurate information from financial management. We suppose two prerequisites for the consistent operation of impact management: a clear strategy for goal achievement and knowledge of impact management itself. Without clear goals and the means to accomplish them, it is very difficult or even impossible to measure and manage an organization's impact. Of the organizations surveyed, 55% reported that they had a written strategy, 41% had an unwritten strategy (e.g. only known to leadership), and 4% of organizations reported no clear mission strategy. Actual knowledge and awareness of impact management is important. More than half of the organizations surveyed were unaware (only 41% of respondents knew what it was), although some were able to answer selected questions about impact assessment after reviewing the whole questionnaire. Some managers seemed unfamiliar with the notions and theory, but they knew and used some tools from the field. Respondents that were familiar with impact assessment were asked whether their organization used impact assessment methods regularly, irregularly, or not at all; results are shown in Figure 3. Nearly all of the managers who knew about impact assessment used it on a regular or at least an irregular basis.

Figure 4 shows which basic indicators of impact assessment tools were used. It appears that a strong impact orientation is not yet critical for NGOs in the Czech Republic, because there is no widespread regular usage of advanced tools. Surveys of client and employee satisfaction are the easiest forms of quality or impact assessment. Other systems or indicators of are on a higher level. More than half of the NGOs used these tools, at least irregularly.

Figure 3. Usage of Impact Assessment Methods (n=15)
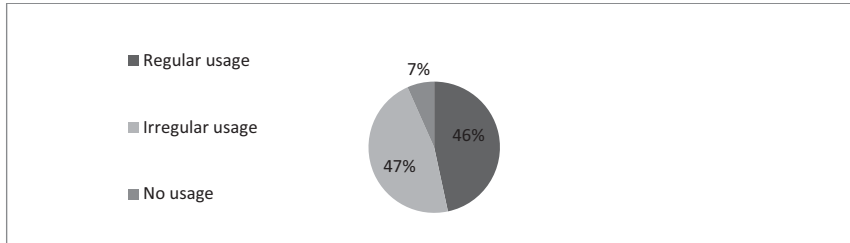
Source: Authors

Figure 4. Impact Assessment Methods and Tools
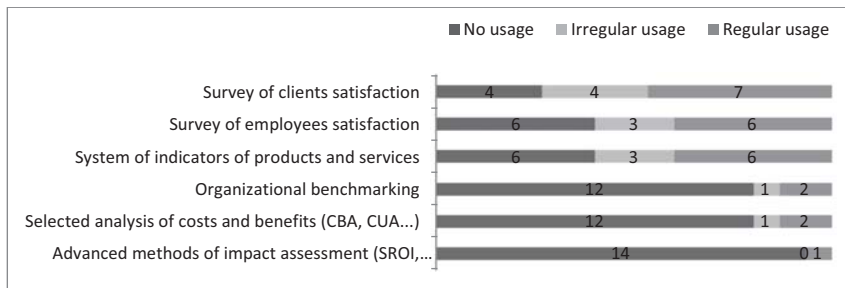
Source: Authors

The situation was different with advanced impact assessment tools such as organizational benchmarking (evidence of organizational results compared to competitors or partners in same field, or across branches) and advanced analyses such as CBA (Cost-Benefit Analysis) or advanced methods such as SROI, SIA, and Social Accounting. These advanced tools were not frequently used even though there are specific manuals for their use in nonprofit sectors [6, 7]. None of the three groups of advanced methods and tools were used frequently. Only three organizations used any tools of CBA or benchmarking. The usage of advanced methods of impact assessment was reported by only one subject.

The organizations using impact assessment tools were, in more than half of the cases, encouraged by the public sector to do so (47% of subjects). The private sector is less interested in the impact assessment of NGOs; 32% of the organizations use impact management because the private sector demanded information. The remaining organizations (21%) did not report anyone interested in the results of their impact assessment. From this, we conclude that in the Czech Republic there has not been strong pressure on NGOs to report impact. The interest of public administration was apparently connected to grants, which also reveals the structure of the organizations that conduct regular impact assessment.

4 Conclusion

Our study of 23 NGOs with the specific legal form of public service corporations slightly confirmed the assumption that advanced management tools were more often used by NGOs with full financial accounting and more sources and employees (approximately 65% of sample).

These organizations also consider financial management to be an important part of proper management (at least short-term planning, budgeting, and the use of some financial performance measurement tools and indicators). The organizations with smaller capacities did not feel an acute need for such management.

The results of the study can be interpreted in two ways. One interpretation is that organizations with advanced financial management tended to also use impact management tools. Another interpretation is that it was not possible to use proper impact management without a background in financial management. We were unable to choose which interpretation was correct; we recommend more detailed study.

The organizations in our sample that often measured impact also cared about stakeholders and benchmark results with their partners or their competitors. This impact assessment was, however, limited in scope. One primary finding was that the main subject demanding social impact reports was public administration. However, requests from the public sector were rare. The impact assessment tools in use were mainly simple ones, such as satisfaction questionnaires; more advanced tools such as SIA and SROI were used rarely.

The study results were pleasantly surprising. We had expected the virtual non-existence of impact management. There were still gaps in understanding the subject and usage of advanced impact assessment and management tools, because it was still unfamiliar territory for Czech NGOs.

The limitations of the study include the rather small sample of organizations and the less common legal form of the organization (public benefit corporation). The selected method of research, i.e. questionnaires, can result in unreliable answers, as organizations may cast themselves in a more favorable and less truthful light. We tried to avoid these pitfalls despite our limited resources. We hope that our insights offer a suitable basis for future research in this area with a broader sample.

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Nursing Care in Social Services Facilities

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Abstract

One of the most topical issues in the provision of social services is the question of funding of nursing care that is provided to users in the institutions with residential social services. The goal of this article is to provide an objective information basis for bilaterally effective changes in the system of providing healthcare and social services. The current setup of basic mechanisms of organizing, providing and financing healthcare and social services in residential social services facilities does not provide the necessary "mirror." Data for this paper was obtained in the survey of 10 institutions with residential social service that was carried out in the year 2014-2015. Relations between relevant variables were verified by using selected statistical methods. This paper focuses on describing the relationship between the type of institutions with residential social services and the contribution to the care according to the level of dependence. The provision of fixed reimbursements from the public healthcare insurance system is definitely the target solution for financing nursing care and rehabilitation in residential social services facilities. The size of fixed reimbursements, or potentially differentiated fixed reimbursements depending on different criteria, will be proposed based on the results of this project.

1 Introduction

"One of the most urgent problems in providing social services is the financing of healthcare provided to users in in-patient facilities. Even though we switched to the public (formerly general) healthcare system already in 1993, the financing of provided nursing care and rehabilitation is a longtime unresolved problem; healthcare provided to users in residential social services facilities was financed at the detriment of provided social services mostly from the budgets of individual in-patient facilities." [4]

One of the first studies, which tried to map the provision of social services that, besides other things, analyzes the legal conditions for providing nursing care in social services institutions, was conducted in 2003 by B. Misconiová, I. Merhautová, L. Průša [3]. As part of this study, field research in five social services institutions was conducted in cooperation with the General Healthcare Insurance Company in order to quantify the total amount of funds necessary to cover the cost of healthcare from the healthcare insurance system.

Another important study, which researched the legal regulation of social services in six selected European countries – Austria, Ireland, Denmark, France, the Netherlands and Switzerland, was conducted by D. Bruthansová, K. Koldinská, M. Vysokajová [1]. The study focused on whether social services were governed by a special legal regulation or were a part of another legal regulation. The study showed that social services in these countries were not governed by a separate legal regulation but usually by the social assistance act and that the level of detail of such a legal regulation considerably differed. The involvement of the state in all these countries is rather big and the state is usually the financial guarantor of social assistance, which, however, does not preclude a big involvement of villages, cities and regional authorities in providing social services.

This paper is the first output of the project RILSA (Research Institute for Labour and Social Afffairs), which took place in 2014–2015. Paper builds on earlier project "Analysis of nursing

and rehabilitation care provided to users of residential social services in residential social service institutions and inpatient health care institutions in the context of the Social Services Act and the Act on Public Health Insurance," which ran from 2008–2009 and it shows, which differences in recent years in this area occurred.

The goal of this article is to provide an objective information basis for bilaterally effective changes in the system of providing healthcare and social services. The current setup of basic mechanisms of organizing, providing and financing healthcare and social services in residential social services facilities does not provide the necessary "mirror" since in particular:

- nursing care and rehabilitation in residential social services facilities are not provided under the same conditions as those that healthcare insurance companies provide to in-patient healthcare facilities;
- social services provided in healthcare facilities are minimal; clients do not receive any care contribution during their stay in-patient healthcare facilities

2 Material and Methods

The data were collected during a survey carried out in 10 social service facilities in the period 10/2014–04/2015. Selection of care facilities took place on the basis of quota sampling with respect to the type of facilities, the age and sex distribution of his clients, etc. The survey was conducted in these facilities to determine the scope of the nursing and rehabilitation care.

Care for the clients was provided during one week. Survey results were obtained for all clients present in these facilities during the investigation, because the information about clients was recorded by nursing staff. In all, the questionnaires were completed by 1,899 clients. Not all the questionnaires were completed and the numbers of persons whose responses were recorded may differ in the following descriptive characteristics.

2.1 Characteristics of the Research Sample

The following criteria were applied in the identification of the individual clients:

- age
- gender
- care allowance according to degree of dependency
- primary diagnosis
- incontinence
- sensory deprivation
- type of facility

The types of facility are old people's home – OPH, home with a special regime – HSR, home for the handicapped – HH.

The average and median age of clients is depending on the type of facility. In homes for the handicapped were younger clients (average 71.4 years, median 80.5 years) that succeeded them special regime homes (average 81.7 years, median 83.0 years) and the oldest clients were in old people's homes (average 83.0 years, median 85.0 years).

2.2 Operations under Examination

During the survey we monitored these operations:

- beginning of care, suspension of care, transfer, termination of care
- taking samples of biological materials – blood and other
- administration of medicaments p. o., parenteral, local, other forms
- application of infusion therapy, inhalation therapy, oxygen therapy

- treating wounds with secretion, without secretion
- enema, lavage
- maintenance of permanent catheter
- insertion of nasogastric probe
- patient examination with instruments – glucometer, colour therapy pack, spirometer, ECG
- training in application of insulin
- treatment of ostomy
- assistance of another person
- occupational therapist's examination before starting occupational therapy, control
- basic individual therapy, using workshops
- training in activities of daily living (ADL)
- basic group occupational therapy, using workshops

3 Results and Discussion

Only selected results of the survey will be examined in this paper.

The first item of information that we will present here is distribution of the clients according to the type of nursing facility and care allowance and the degree of their dependency (Table 1). This combination of information about the type of facility and care allowance was available for 1,721 clients. The highest share in the sample was that of clients in the old people's homes (66.4%), followed by clients in the homes for the handicapped (17.7%), and the lowest share of the clients was in the homes with a special regime (15.9%).

Table 1. Numbers of persons by care allowance in individual types of facility

Type of institution	care allowance according to level of dependence				
	I.	II.	III.	IV.	without allowance
Old people's home	223	305	280	185	150
Home for the handicapped	34	72	91	91	17
Home with a special regime	16	59	87	101	10
Total	273	436	458	377	177

Source: RILSA research in 2015

Given the distribution of the clients in the individual facilities and their level of dependency we were interested in the dependency between these two tested characteristics.

We applied to this basic classification a chi-square independence test of distribution of the clients according to type of nursing facility and care allowance. This type of test "*belongs to a wide category of methods for working with qualitative attributes designated in modern literature as categorical data analysis.*" [2]

The tested hypotheses were as follows:

- H_0: the characters in the contingency table are independent
- H_1: non H0

As the test criterion was chosen

$$G = \sum_{i=1}^{r} \sum_{j=1}^{s} \frac{\left(n_{ij} - n_{ij}' \right)^2}{n_{ij}'} \qquad (1)$$

which has in the case of independence with a sufficient number of observations approximately χ^2 distribution with $v=(r-s)(s-1)$ of the degree of freedom and the critical segment is defined by the quantile of the distribution.

In this specific case the test criterion was G=121.1, which means that with a 5% level of significance we rejected the tested hypothesis H_0 on independence and it can be considered the dependency of both qualitative characteristics (type of facility and care allowance according to the degree of dependency) proved. In other words, we have here a statistically significant relationship between the distribution of the clients by type of facility and the degree of their dependency; the clients are not distributed randomly.

Further statistical methods will be published together with further published results of this project. Many cases involve a concatenation of events and its testing is not meaningful and hence will not be performed.

Figure 1 shows clearly a comparison between the average financial costs of monthly care per client in the types of nursing facilities under examination. It is clear that the costs of care in all types of facility rise in line with the clients' increasing degree of dependency. What is rather surprising here is that the average costs of HH are lower than those of OPH.

The highest average monthly costs regardless of the degree of clients' dependency are in the old people's homes (CZK 10,968); this sum is a little lower in the homes with a special regime (CZK 10,371), and lowest average costs are indicated in the homes for the handicapped (CZK 7,217).

Figure 1. The average amount of the cost of care per month according to the clients level of dependency and the type of centres providing nursing care in social services facilities
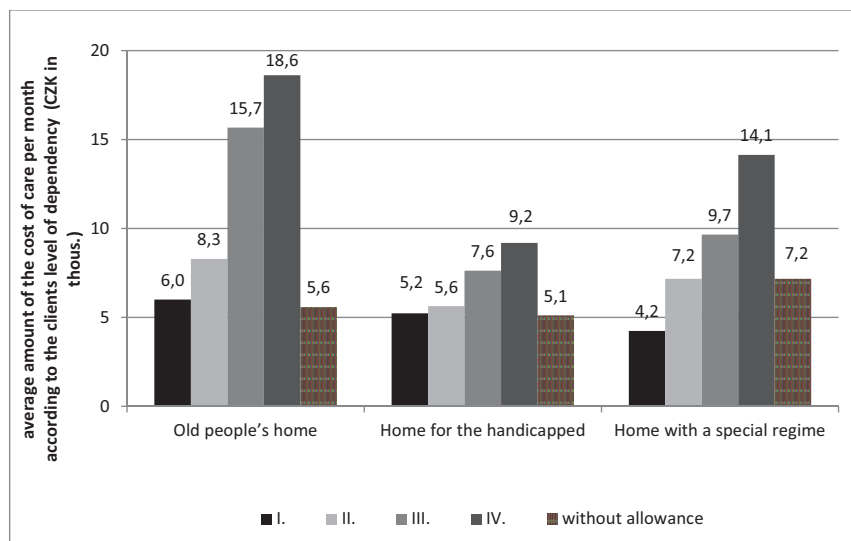
As in Table 1, this information about the distribution of persons by type of nursing facility and the level of their dependency applies to the whole of the Czech Republic. As of 31.12.2014, there were 118,788 registered persons in the Czech Republic in the three types of nursing facility examined by us.

Table 2. Total numbers of clients in individual types of nursing facilities according to level of dependency for whole the Czech Republic as of 31.12.2014

Type of facilities	Number of clients (December 31, 2014)	care allowance according to level of dependence			
		I.	II.	III.	IV.
Old people's home	35 857	6 285	8 870	9 390	7 148
Home for the handicapped	12 500	1 177	3 146	3 518	4 448
Home with a special regime	13 648	1 450	3 098	3 928	4 325

Source: Internal data of the Ministry of Labour and Social Affairs

If we add up this information for the whole of the Czech Republic as of 31.12.2014 with average financial costs from our survey, we obtain an estimate of the total costs. In our overview the total costs are calculated as annual costs in thousands of crowns (see Table 3). This means that there were taken the numbers of people with various levels of dependence for the entire country and multiplied with the average points that came out of this research. It follows from this that the least expensive group are the clients without a care allowance. Generally speaking, it is evident here that average care costs expended on a given group of clients rise in line with the increasing degree of dependency. This estimate suggests that annual costs of care for clients in these types of facility totalled CZK 7.7 billion. While health insurance companies paid for these care only about CZK 1.2 billion. Total costs increased by CZK 2.5 billion compared with the survey realized in 2008–2009, the amount of refunds from health insurance system is practically unchanged.

Table 3 .Estimated total costs by care allowance in individual types of facility (CZK in thous.)

Type of facilities	care allowance according to level of dependence					Total
	I.	II.	III.	IV.	without allowance	
Old people's home	452 571	881 931	1 765 980	1 596 940	279 317	**4 976 739**
Home for the handicapped	73 844	212 696	322 152	490 554	12 946	**1 112 192**
Home with a special regime	73 878	266 780	455 135	733 810	72 967	**1 602 570**
Total	**600 293**	**1 361 407**	**2 543 267**	**2 821 304**	**365 230**	**7 691 501**

Source: RILSA research in 2015

4 Conclusion

The provision of fixed reimbursements from the public healthcare insurance system is definitely the target solution for financing nursing care and rehabilitation in residential social services facilities. The results of this survey show that the fixed amount of reimbursement for nursing care in residential social services facilities depends on the type of facility and the level of dependency. Yet, the amount of individual fixed reimbursements will depend on conciliation in the entire legislative process. The results of the survey represent a key source of information for this decision-making process.

This solution represents a system measure that will help to straighten mutual relationships in providing and financing social and healthcare services in residential social services facilities as well as in in-patient healthcare facilities. Our calculations show that if healthcare insurance companies pay for the actual nursing care and rehabilitation provided to clients in residential social services facilities, it will be possible to finance the operation of these facilities from a care contribution, from the client's payment for his/her accommodation and

meals provided in these facilities and from reimbursements from healthcare insurance companies for provided care without state subsidies. This solution should also include a contribution for care provided to clients in in-patient healthcare facilities, as Průša et al say [4].

In setting up the system links between both systems of healthcare and social services, it seems the best to found so-called nursing care facilities and to incorporate them into the network of social services and healthcare facilities.

Implementation of realised survey showed that the scope of nursing and rehabilitation care in residential social facilities is significantly higher than health insurance companies provide to these facilities. Acquired findings represent an important source of information for determining the fixed amount of reimbursement for nursing care provided in these facilities. The transition to this system of financing nursing care can be implemented simultaneously with providing of care allowance to clients whom care is provided in a medical facility. That way there would be a settlement system of financing social and nursing care in institutions of health and social institutions.

The total cost of providing annual nursing care are about 7.7 billion CZK, while it is ranged according to types of facilities (from 7,217 CZK in homes for the handicapped to 10 968 CZK in old people's homes), their share in the total average costs ranges from 14.5% in homes for the handicapped to 64.7% in old people's homes.

Acknowledgements

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Can Demographic Characteristics Explain Intermunicipal Differences in Production of Municipal Waste?

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Abstract

Ongoing demographic changes have been influencing many aspects of society and its functioning, infrastructure including waste management is not any exception. This paper aims at quantifying how demographic variables influence the municipal waste generation in the Czech Republic. For this purpose similar variables as in studies from abroad are constructed and reviewed methods are applied on the data for municipalities from the Czech Republic in year 2011. 8 indicators for 5 887 municipalities were investigated. For the analysis correlation and multidimensional linear regression were used. The resulting regression model included average household size, percentage of population with tertiary education and sex ratio. The model assumptions for linear regression analysis were met and resulting model was significant but regardless, only small part of municipal solid waste variation was explained.

Keywords: municipal solid waste; demographic change; influencing factors; regression

1 Introduction

Demographic change as a social phenomenon is constituted mainly by the population ageing that is associated with a growing number and proportion of the elderly in the population, a falling number and proportion of children and an increasing burden on economically active people. At the same time, there is a selective migration of certain population groups from the countryside and peripheral areas to the centres/their hinterland and, conversely, suburbanisation processes. Simultaneously, the average household size decreases, while the proportion of one-person households and, subsequently, of one-member households of the elderly rises. All the changes then have an impact on diverse ways of life and the functioning of society. This may relate to the offer of the manpower, public budgets, health and social services and also infrastructure [10].

Current demographic trends have also a significant impact on environmental service provision at the local level. Especially municipal waste management seems to be affected by the development of demographic characteristics enormously, because households and their behaviour influence the municipal waste production, treatment (incl. recycling), and the effectiveness of charging policy. The environmental (or recycling) behaviour is influenced also by other intrinsic, and extrinsic factors with different significance and for better understanding of this issue, it is important to analyze and if possible to quantify the effects of various factors.

The relationship between demographic characteristics of the population and households on the one hand, and waste management on the other has been examined by a number of studies that often arrived to different conclusions if and how important is the role of demography in explaining of various aspects of waste management and production. From the literature review it seems that average household size, age, gender and attained education are the most frequently analyzed demographic variables.

Unambiguous are the conclusions regarding household size, in several studies [3], [9], [15], [17] for different populations it has been proved that average generation of municipal waste per person falls with the growing number of household members.

The second most frequently analyzed demographic characteristic is age or age distribution of inhabitants. In case of this indicator a problem of comparability of results arises because in some cases age is described with mean or median age, while in other cases percentage of people in age groups is taken into account, the age group intervals differ among studies. Sterner and Bartelings [21], or Hoffmeister and Gellenbeck [12] found out that elderly people generate less solid waste. According to Sterner and Bartelings [21], it may result from a rather modest way of life of older people. Beigl et al. [2] analyzed the above mentioned relationship from the viewpoint of the representation of three in demographical studies often used age groups (0-14, 15-59 and 60+ years). They found positive influence of the proportion of the persons aged 15-59 on the total generation of municipal waste only in the European cities with medium incomes. Similarly, Lebersorger and Beigl [17] tried to quantify the influence of representation of the persons from four age groups (0-4, 5-14, 15-59 and over 60 years) on the generation of solid municipal waste using a regression model but on the municipality level, it has not turned out that the representation of the persons in any of the age groups is significantly correlated with waste generation. This is why the authors (e.g. [13]) have suggested that age structure has only weak, if any influence on waste generation.

In some cases, gender is another analyzed demographic characteristic. This variable was examined by D'Elia [8] on the household level, by Hage, Söderholm [11] on the municipal level and Talalaj, Walery [24] on the county level. The first two studies did not find any significant relationship between gender and the quantity of generated municipal waste that is consistent with a broad review of older studies [19]. According to Talalaj, Walery [15], in communities with higher share of women there is also higher waste production.

Last more frequently analyzed demographic characteristic is the level of attained education but the results are ambiguous. Benítez [4] stated that persons with elementary education generate on average more municipal waste than those with a higher level of education. However, Hornik et al. [13] did not find any significant relationship between education and waste generation.

In order to analyze the relationship between demographic development and waste management, a use is made of both one-dimensional and multidimensional methods such as the correlation analysis [9], the one-dimensional regression analysis (as one of the methods employed by [2]), an analysis of time series or the input-output analysis. However, the multidimensional regression analysis is the most frequently used, e.g. [2], [11], [15], [17] and [21].

The main goal of this paper is to evaluate how demographic variables influence the municipal waste generation in the Czech Republic. For this purpose similar variables as in studies from abroad are constructed and reviewed methods are applied on the data for the Czech Republic.

The paper consists of four chapters and is structured as follows. The first chapter describes the current state of knowledge in the research dealing with the demographic change and its influence on waste generation. In the second chapter, the method and data used for the purpose of the research in the Czech Republic are presented. The third chapter introduces then the main results of the research. In the last chapter the research results realized in the Czech Republic are concluded.

2 Material and Methods

Based on the literature review and available data a dataset for municipalities in the Czech Republic was created. For the description two sources were needed – the first for the demographic indicators and the second for the information about waste production. These two sources have to cover the same units (municipalities) and have to be available for the same year.

The intention was to use similar information that was used in above mentioned studies. Because demographic indicators such as household size or level of education are not a part of routine statistics of the Czech statistical office (or any other public institution), it was necessary to use the data obtained within the Population and Housing Census. Data from the last Census in 2011 were used.

As for the data about waste production, waste management information system (ISOH) was used. ISOH is a statewide database collecting data about waste production and treatment since 2001. Every waste producer who produces yearly more than 100 kg of hazardous or 100 tons of nonhazardous waste has to report his yearly production into the system [22]. In the case of municipal waste municipalities are seen as waste producers and they are bound to report into the system. But not all the municipalities surpass the given limit for produced waste amount. In 2011 about 4 % of all Czech municipalities did not report its waste production because these units are mostly rather small, only 1 % of state population was living there.

Based on these two sources, the database contained following indicators at municipal level:

- Average household size (HHS),
- Mean age (MAGE),
- Percentage of population aged 0–14 years (AGE0014),
- Percentage of population aged 15–64 years (AGE1564),
- Percentage of population aged 65 and more years (AGE65),
- Sex ratio (IMA),
- Percentage of population with secondary education (SEC),
- Percentage of population with tertiary education (TER),
- Production of municipal solid waste in kg per capita (MSW).

Sex ratio was computed as number of men per 100 women in the municipal population. For assessment of variables SEC and TER the number of people with secondary, resp. tertiary education was related to number of inhabitants aged 15 and more years.

The analysis itself comprised an explorative data analysis, correlation and multiple regression analysis of data at the municipal level in the year 2011. All computations were made by applying IBM SPSS Statistics 20.

The purpose of explorative analysis was the basic description of the data and control of assumptions for linear regression. In the first step basic descriptive statistics was computed and extreme values were tested and corrected if necessary. In general every entry that differs significantly from the mean was controlled. Afterwards, normality of distribution was tested. As most of the data were normally distributed, Pearson correlation coefficient was used. Based on the correlation among the independent variables and between the independent variables and the dependent variable municipal solid waste, the selection of variables for regression analysis was made. Selected were indicators with higher significant correlation with municipal solid waste.

The assumptions of linear regression (linear relationship between dependent and independent variables, homoscedascity, multicollinearity and normality of the error distribution) were tested [17].

3   Results and Discussion

After exclusion of municipalities with no reported data production or with extreme values the sample consisted of 5 887 municipalities from all regions. The average municipal solid waste production in 2011 was 268 kg per capita (see Table 1).

Table 1. Values of descriptive statistics for municipal solid waste, CR, 2011

	Minimum	Maximum	Mean	Std. Deviation
Municipal solid waste	0,02	651,13	268,58	144,73

Source: ISOH

To assess the relationship between municipal solid waste production and selected demographic characteristics, correlation analysis was performed. Table 2 shows values of Pearson correlation coefficients between all variables. We can see significant correlation between municipal solid waste and average household size, percentage of population with tertiary education and sex ratio.

Our results confirmed negative (but rather weak) correlation between waste production and average household size (thus bigger households produce in average less municipal waste per person than smaller households). This result is not surprising when household members share the consumption goods such as food, packaging, newspapers etc. [3], [9],[15], or [17] also came to this result and found the relationship significant. Only [21] found the correlation as not statistically significant. The knowledge of the relationship between the waste production and average household size helps the municipal representatives to accommodate the container policy (not only for household mixed waste, but also for separate collection).

Weak but significant negative correlation was found between waste production and sex ratio. Talalaj and Walery [24] also confirmed the positive relationship between gender and waste production and concluded that higher share of women on the municipal level (not the number on men and women, or the total population) predicts the higher waste production. The reason lies in the higher attention to their appearance [24], or more frequent acquisition of products through catalogue shopping or home delivery services [7]. On the other hand other studies did not find any significant relationship between gender and the quantity of generated municipal waste [19], [8], [11]

Last significant correlation but positive was indicated between waste and percentage of population with tertiary education - in municipalities with higher share of tertiary educated people the waste production was higher. But there is no relation with secondary education. These results are in the contradiction with Benitez et al. [4] that came to the result that the higher level of education the less municipal waste production should be expected. Other studies did not find any significant relationship between education and waste production [13], or studied the relationship between the level of education and recycling rate. While Jenkins et al. [14] found the positive relationship between the educational level by a person with the highest education in a household and the recycling rate, Hage and Söderholm [11] concluded that because of the higher costs of sacrificed opportunity of higher educated households the recycling rate of plastics goes down when the educational level increases.

All characteristics connected with age were insignificant which was a little bit surprising, when [3], [12] or [21] confirmed the relationship and found that older people generate less municipal waste. On the other hand Lebersorger, Beigl [17] found out that the age structure has weak, if any influence on waste generation and Hornik et al. [13] rejected the influence of age on the municipal waste generation.

These three significant variables (average households size, sex, and education) will be inserted into the regression model.

	HHS	MAGE	AGE0014	AGE1564	AGE65	SEC	TER	IMA	MSW
HHS	1	-0,456**	0,382**	0,021	-0,296**	0,050**	0,025	-0,056**	-0,104**
MAGE	-0,456**	1	-0,754**	-0,350**	0,857**	-0,038**	-0,195**	-0,056**	0,005
AGE0014	0,382**	-0,754**	1	-0,241**	-0,502**	0,045**	0,195**	-0,139**	-0,011
AGE1564	0,021	-0,350**	-0,241**	1	-0,710**	0,031*	0,025	0,248**	0,020
AGE65	-0,296**	0,857**	-0,502**	-0,710**	1	-0,057**	-0,161**	-0,121**	-0,009
SEC	0,050**	-0,038**	0,045**	0,031*	-0,057**	1	-0,154**	-0,099**	0,004
TER	0,025	-0,195**	0,195**	0,025	-0,161**	-0,154**	1	-0,075**	0,094**
IMA	-0,056**	-0,056**	-0,139**	0,248**	-0,121**	-0,099**	-0,075**	1	-0,068**
MSW	-0,104**	0,005	-0,011	0,020	-0,009	0,004	0,094**	-0,068**	1

Source: Authors

As one of the assumptions for the linear regression is absence of multicolinearity between independent variables, the correlations between household size, tertiary education and sex ratio are also important (Table 2). Both the household size and tertiary education has weak but significant relationship with sex ratio. To test the assumption that selected explaining variables are not highly correlated, the variance inflation factor (VIF) will be examined within the regression analysis.

Regression equation for model with three significant variables follows:

$$MSW = 466,224 – 72,256\ HHS + 3,057\ TER -0,379\ IMA \qquad (1)$$

This model explains only 2,5 % of the variation of municipal solid waste between municipalities, which is really low compared to regression models from other studies. Reported R^2 achieve usually at least 50 % (e.g. [17], [4] or [21]), but the results depend also on sample size and number of independent variables. Nevertheless, this model is statistically significant. The standardized coefficients (Table 3) indicate that household size has the highest relative impact, followed by the share of tertiary educated inhabitants and sex ratio. The model assumptions are met. Between dependent and independent variables there is a linear relationship and all of them showed normal distribution. The results of multicollinearity measurements do not indicate that there is multicollinearity between independent variables because all values of tolerance are higher than 0,2 and variance inflation factors are smaller than 5, these two values indicate the acceptable limits.

Table 3. Regression model for municipal solid waste (coefficients, significant and multicollinearity measurements), CR, 2011

	Coefficients	Standardized Coefficients	t Value	Significance	Tolerance	VIF
Constant	466,224		19,603	0,000		
HHS	-72,256	-0,110	-8,515	0,000	0,996	1,004
TER	3,057	0,092	7,125	0,000	0,994	1,006
IMA	-,379	-0,068	-5,228	0,000	0,991	1,009

Source: Authors

When demographic characteristics explain only 2.5 of the variation, other factors influencing the municipal waste generation seems to have higher significance in the Czech Republic. Because the functioning of waste management system and its performance are supported by the educational and informational campaigns in the long term the role of the environmental behaviour should stay in the centre of interest (e.g. [6], [16], [25]). Another important factor represents the recycling rate of the municipal waste – the higher recycling rate

the less municipal waste is generated ([1]). Environmental policy and the implementation of broad scale of instruments (e.g. unit-based fees) also influences the municipal waste generation ([5], [20], [23]). All these factors should be included in the model that aims to explain the amount of municipal waste generation.

4 Conclusion

The purpose of the paper was to evaluate the influence of demographic characteristics on municipal solid waste production. Because in the Czech Republic there are no waste management data on individual or household level we decided to use the data for municipalities. This leads to some simplifications regarding conclusions about individual behaviour in waste production but this is the only method enabling in this case the statistical analysis and was used in several previous studies, e. g. [2], [11], [17].

Based on reviewed studies, we constructed 8 demographic variables that can explain the intermunicipal differences in waste production. We used the same computing method, the linear regression analysis, as was used in other reviewed studies ([2], [4], [11], [15], [17], [21]). By contrast to these studies, our model explained only 2,5 % of intermunicipal variation in solid waste production. That means that there are other factors that have much greater influence on municipal waste production than demographic characteristics (e.g. environmental behaviour, recycling rate, or policy instruments) However it is important to state that the impact of demography is also significant.

Only three of the selected demographic characteristics were found statistically significant – average household size, percentage of people with tertiary education and sex ratio. We did not find any evidence that support the assumption that the waste production vary between different age groups. In agreement with studies from abroad ([2], [9], [15], [17]), the most important demographic characteristics was average household size, with growing household size the average waste production per person is decreasing.

In general, we can conclude that there is significant relationship between demographic characteristics and waste production, but in comparison with other studies and on the municipal level for the whole Czech Republic this relation is rather weak. Greater impact can be attributed to other factors, such as waste management organisation and logistics. The obtained results confirmed the desirabilty of further research of other factors and possibly other waste streams.

Acknowledgements

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Atmospherics Measurement:
The Ways to Make Public Goods Available

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Abstract

The purpose of this article is to introduce the concept of atmospherics to the public sector research. Since museums as cultural institutions preserve the cultural heritage and take care of socially and culturally significant public goods, they should also guarantee the accessibility to cultural objects for different social groups and provide them sufficient information about preserved cultural objects. Although **museums nowadays find themselves in the situation of governmental funding reduction, their main objectives along with preservation of cultural objects, security issues, and accessibility should be focused on** development of such museum services as structured itineraries, saturated with information maps, improvement of public service areas in park and museum complexes. Framed in the theoretical concept of atmospherics the qualitative study on functional characteristics of the Peterhof State Museum-Reserve (Saint Petersburg) provides, firstly, new methodology for the analysis of visitor attraction and visitor experience, secondly, new managerial strategies in order to include different social groups in the process of receiving knowledge about cultural objects.

Keywords: atmospherics; visitor experience; cultural heritage; museum; public sector

JEL Classification: H14, H72

1 Introduction

The contemporary museums are forced to be oriented on visitor attraction due to government funding reduction and market economy transition. Since the competition between museums increases, museums are obligated to extend their services spectrum. Moreover according to this policy they should develop new services and make it accessible for different visitor social groups [6]. It becomes important for museum managers to augment visitor satisfaction and their involvement level.

There are a lot of ways to increase visitor involvement: from information availability [10] to measures which increase museum collection learning [2]. In such conditions it is important for museum management to use results of visitor studies which permit to learn the visitor satisfaction level and as consequence build visitor involvement strategy in a right way [2], thereby providing the museum services with competitive advantages and greater coverage of different visitor social groups.

The search for new marketing and management solutions in order to attract visitors to museums is related largely to changes that have occurred in visitor (tourist) behavior: nowadays tourist wish is not just to 'stay' in a museum, but to gain a new experience, new emotions and learn something new [12]. In this regard, tourist behavioral practices are under a special scope of research: studies on measurement of visitor satisfaction and willingness to revisit the museum, or recommend it to friends [12, 1, 5]; case studies of the best museum practices to create the informative environment for visitors that contributes to the stimulation of their emotional and cognitive processes [7]; studies on museum space and its influence on visitor behavioral practices [12]. Studies show that it is important to find out not only the degree of visitor satisfaction, but to analyze the museum environment and the factors that affect the experience that visitors get while visiting museums. Among such factors could be listed different

services, spatial organization of exhibitions and landscape, communication with other visitors or smells and noise in museums and parks. In addition, it is important to study factors that influence the visitor behavior in museums and parks in general and in specific areas of museums and parks in particular.

Framed in the theoretical concept of atmospherics the qualitative study on functional characteristics of the Peterhof State Museum-Reserve (Saint Petersburg) aims to test qualitative methods for the analysis of visitor attraction and visitor experience, and elaborate new strategies in order to include different social groups in the process of receiving knowledge about cultural objects.

1.1 Atmospherics as a Tool for Management Strategy of Visitor Attraction

It is a multifaceted task to conduct the visitor satisfaction research in the architectural and park complexes. Such complexes combine not only the objects of cultural and historical heritage, but also the diversity of the landscape. For this kind of cultural organizations the atmospherics [4; 9] and its impact on visitor behavior is of particular interest. It allows to shape marketing strategies according to the understanding how particular elements of the atmosphere (architecture, landscape, information support, the quality of related services) can influence visitor willingness to revisit this place. Thus, applying the atmospherics model to the museum environment has considerable potential to derive specific visitor behavioral practices and analyze the role of the atmosphere in visitor experience [8]. Museum then is understood as an "informal learning setting" [8].

Approaches of atmospherics elaborated by P. Kotler [9], J. Baker [3] and M. J. Bitner [4] as well as theoretical findings made by Forrest [12] were combined in order to sort out three components of the service environment that may have the impact on visitor emotions and behavior:

- ambient factors understood as environmental features - various noises, smells, cleanliness, sounds and air quality (temperature, humidity, ventilation);
- design as a combination of functional and aesthetic elements (layout). Functional features include spatial planning, navigation (the availability of signs that can be means of communication between visitors and organization). A special attention should be paid to the spatial functionality which facilitates the visitor access to different facilities. This is particularly necessary when the service is consumed by visitors themselves (without support of the organization, such as guided tours). Aesthetic elements include architecture, colors, textures and materials.
- social interactions (social factors) that fix the impact of other visitors and staff on visitor experience (number of visitors at the site, their appearance and behavior).

2 Material and Methods

2.1 Atmospherics Measurement Methodology

The atmospherics concept in this article was studied on the case of the Peterhof State Museum-Reserve which is located about 30 kilometres away from Saint-Petersburg (Russia). It is an object of cultural heritage and was constructed in 1714 by Peter's the Great decree. It contains palaces, gardens and fountains on its territory and it is called 'Russian Versailles'. As the Peterhof State Museum-Reserve is very huge, the pilot stage of research was conducted in the Lower Garden which is 1,02 km longwise.

The Lower Garden is one of the biggest part of Museum-Reserve which has a look-out over the Gulf of Finland. It consists of three palaces, four cascades, twenty two fountains and a great deal of alleys for walking.

There are three entrances for visitors in the park, one of which is from the side of the gulf. The last is available for those who travel to the Peterhof from Saint Petersburg center by boat. To estimate the Peterhof atmospherics, the methodology was elaborated and applied within the pilot research stage. The methodology is aimed to measure not only the atmospherics components (ambient factors, design as a combination of functional and aesthetic elements, and social interactions), but the behavioral practices influenced by the atmospherics.

For this stage of research there was chosen two methods of data collection, namely semi-structured interview and observation methods.

The semi-structured interview method was applied in order to estimate the atmospherics and behavioral practices were measured by the observation method. This method had a range of restrictions but it was used because it allowed to operationalize the atmospherics concept and to prove its applicability to Peterhof conditions, to check the question formulation for the respondents. This method does not permit to attain the representativeness level as it possible using the survey. Moreover the collecting data encoding and its analysis are very time consuming, but it helps to prepare further questions to the questionnaire for the core research stage.

In the beginning of the pilot research the guide contained the questions directed to measure three atmospherics components, but in time it became clear that it is impossible to get the information from the respondents about all three stages. The respondents could not operationalize reserve quality ambience (noises, air quality, smells) and reserve aesthetic elements (architecture and color), as well estimate these characteristics. There were some questions partially concerned about reserve functional elements, namely the questions about visitor itineraries during their spent time in the museum-reserve (the map to indicate the visitor itineraries was used) and photos of cultural objects that they will upload into the social networks.

The semi-structured interview method is valid for reserve design estimation and social factors partially. That is why the research tool included the questions concerned with the navigation availability, opportunities for access to the reserve cultural objects and reserve staff interaction. There were no answers to questions about interaction with other visitors. That is why this part of social factors was not estimated by study tool.

The semi-structured interview could partially estimate some behavior practices, namely the questions aimed to ask about frequency of return at the museum reserve and to define the respondents' actions caused by the visit to the reserve.

This research tool contained also the questions about reserve atmospherics images and respondents social characteristics such as gender, age, education level, occupation.

The observation method was included after the analysis of first interviews which demonstrated that respondents cannot describe by words their behavioral practices used during their pastime in the museum reserve and describe the most\least favorable objects there. This method was applied at the end of the pilot research stage. As consequence the research team had no time for proper observation tool elaboration. It was possible to estimate only the respondents' actions variety spread during their pastime into the museum reserve.

The pilot research was conducted during the high season in May 2015. It supposed that different visitor itineraries and location could influence on their atmospherics perception. As consequence the different areas with different level concentration of visitors was chosen during the sample planning. Among them it was the the area near the water, near the main fountain cascades, area near the Grand palace, fountain-crackers, the benches in the thick wood. As for observation the interviewers was staying on the chosen areas and fixed the visitors actions during their stay there in the observation form.

As for semi-structured interview method the same areas for questioning was chosen. It supposed to question an equal ratio according to gender, age and visitor type (tourists or locals), but it turned out impossible because of visitor flows. As result the visitor type wasn't took into

account. Within this method there were collected 152 short semi-structured interviews (about 5-15 minutes long) with reserve visitors. According to the age it was questioned 41% of those whose age is less than 30 years, 25% of those whose age varies from 31 to 45 years, 19% of respondents who are from 46 to 60 years and 15% of those who are more than 60 years. The most part of respondents in the sample are women (81%), the men proportion is significantly less (19%).

3   Results and Discussion

This section presents the results of the evaluation of the functional elements and visitor behavioral practices observed in the museum-reserve. The section represents the results analysis overlapped with the discussion.

Analysis of the functional features of the Peterhof State Museum-Reserve (in particular, the convenience of the navigation system) has revealed that the lack of maps and signs in the park affects the behavioral practices of park's guests. Guests who visit the park without a guided tour choose itineraries intuitively. They might have followed proposed in advance by the park management options that would allow to visit various sites in different ways (chronological, historical, geographical, etc.), but such pedestrian itineraries were not elaborated. Visitors are guided by their own pre-knowledge about the park, they apply the information obtained about the park in advance via different methods such as guide-book, official webpage, word-of-mouth, memories from their previous visits, and not in accordance with a predetermined marketing strategy of the park.

"According to the respondent the system of navigation is well. He doesn't use the maps and other guide signs because he knows this park since childhood" (Man, 50 years)

Park management could elaborate different possible itineraries, for example, chronological, historical, geographical, etc.). A visitor in fact is left to himself to find objects to visit. The lack of information desks or maps constrains the visitor's access to certain cultural objects, sculptural compositions and services (cafes), and also leads to the lack of information about exhibitions in some small museums, located in the park:

"We need the map. We would like to find out where we are, where we can find the cafe to drink a cup of coffee" (Man and woman, 32 and 22 years)

"There is no map inside the park. It is only outside. Now we don't know where to go. We hope on the guide signs" (2 women, 28 years)

The lack of signs information and directions affects the level of knowledge that visitors get in the park. Many people want to learn more about the park and sculptural compositions, but they cannot get necessary information. Installed QR-codes are not always available for use, as not all visitors have the access to the Internet. Some visitors ask park's staff to help As a result tourists visiting the park without a guided tour have insufficient knowledge sometimes complemented by stories overheard from tour groups. The lack of signs and maps affects the overall satisfaction of the visit:

"Couldn't they make the cheapest map for those who need. There is no practically navigation. If there was wi-fi... In some places there is wi-fi, but if you don't have a gadget... " (Women, 62 and 48 years)

By conducting interviews it was revealed that respondents did not remember the acts committed during their stay in the museum complex. Therefore, the most effective way to fix the visitor behavior was to use the method of observation.

According to the results the most popular options in the museum-reserve are pauses or breaks when visitors could eat snack, take pictures, or rest. It was fixed that visitors choose the places for their breaks (to rest and for food consumption) with the smaller number of visitors and where cultural objects are less recognizable for tourists. The data indicates that the places next to the Gulf of Finland (regardless of location) are favorable points for food consumption.

Visitors taking photo were fixed at all places with a high number of visitors. Another result shows that a high number of resting visitors was fixed in different parts of the studied park with the high concentration of benches.

One of the characteristics of the public goods is non-rivalry, which means that the consumption of the public goods by some groups does not prevent from simultaneous consumption by other groups. On the one hand, the consumption of public cultural goods in the museum reserve is not restricted to an 'exclusive' consumption. The reserve is open to all categories of visitors, while some of them have financial preferences. On the other hand, since different groups have different pre-knowledge and are equipped with different devices and informational sources, the reserve is lacking informational and educational aspects that give visitors knowledge about the museum, park and fountains. Structured itineraries, saturated with information maps, improvement of public service areas could have created the opportunities for the various behavioral practices that are predefined by the museum reserve. In this case, the museum and park reserve has opportunities to concentrate visitor's attention not only on most visited and well-known tourist places, but also on exhibitions and small museums that need to be promote.

4 Conclusion

This article is aimed to demonstrate the pilot study results of the applicability of the atmospherics to the Peterhof State Museum-Reserve. The atmospherics can help to define the visitor behavioral practices and as consequence to elaborate an effective marketing strategy for services development and wide coverage of visitor attraction. This research shows the advantages and disadvantages of elaborated qualitative methodology and its application to such huge museum reserve as Peterhof.

The tool used for the pilot stage of research has the range of restrictions which hinder to measure all atmospherics components and its influence on visitor behavioral practices. The semi-structured interview method is able to get the relevant data about atmospherics functional characteristics and social factors, namely navigation and interaction with staff. Behavioral practices are better to learn with the help of the observation method which can fix the unconscious visitor's actions during the pastime in museum reserve.

This research tool has a range of gaps which needs to be developed. In particular, ways to measure the ambient factors, design and social interactions with other visitors must be found. Moreover the research tool, namely observation method, should be further elaborated. To get a representative sample the semi-structured interview guide should be elaborated into the questionnaire.

As the results show, the main objectives for museum management along with preservation of cultural objects, security issues, and accessibility should be focused on development of such museum services as structured itineraries, saturated with information maps, improvement of public service areas in park and museum complexes. It means that since museums as cultural institutions preserve the cultural heritage and take care of socially and culturally significant public goods, they should also guarantee the accessibility to cultural objects for different social groups and provide them sufficient information about preserved cultural objects. One of the main tasks of cultural institutions is to give the knowledge about the cultural objects they are responsible to preserve to all visitor's groups. In this case the atmospherics concept gives new perspectives on public goods consumption.

As such elements of the atmospherics concept as social interactions, ambient factors and aesthetic features were not operationalized with the chosen methods, the future research concentrates on the search and probation of the new methods.

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Free Public Transport: The City of Žilina

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Abstract

Tallinn, the capital city of Estonia, is shining example of innovative and progressive city. Especially in one particular policy – free public transport. Fare free public transport became very articulated policy just before local election 2014 in several Slovak cities. Many politicians, inspired by Tallinn, had free public transport policy as the major point of their political agenda. This article is devoted to free public transport policy in Slovak city Žilina. It analyses presentation of the policy in the city and perception of the policy by the politicians who advocate proposal and implantation plan. The article is an initial phase of analysis of fare free public transport in Žilina. Therefore, it does not bring final conclusions but rather shows several potential pitfalls of policy which is based Tallinn's case.

Keywords: public transport; fare free; Slovakia; Tallinn.

JEL Classification: H40, R49

1   Introduction

The debate about the preference of public transport at the expense of personal automobile transportation is up to date not only for environmental impacts of traffic in cities (smog, greenhouse effect) but also impacts on the quality of life (noise, traffic jams). Public transport policies are very sensitive because they concern all people who are living, working, or visiting the city. Currently, the idea of free public transport is attractive policy for local politicians. Moreover, the illusion of a completely free service is interesting marketing in the political contest.

This chapter provides short review of the current state in free public transport, mostly focused on Tallinn due to the aim of the article to confront policy of free public transport in Tallinn and similar initiative in city of Žilina. The Introduction provides brief summary of free public transport in Žilina. It is followed by short description of both cities – Žilina and Tallinn. The article also provides analysis of the free public transport initiative in Tallinn and also other research which is relevant in this case.

For the purpose of this paper is used policy analysis approach (analysis of existing policy proposal) what is analytical and descriptive approach that attempts to explain policies and their development.

This paper should be perceived as an initial phase for the future research in the field of free public transport in Slovakia. Therefore, it does not bring final conclusions but rather shows several potential pitfalls of policy proposal in Žilina.

Whereas the city of Žilina is the first relatively large city (fourth most populated city in Slovakia) that seeks to introduce fare free transport for residents, the systematic analysis of this issue in Slovakia is needed. The purpose of this article is therefore analyse the discussion about the policy in the city and perception of the policy by the politicians who advocate proposal and implementation plan. The article shows two potential pitfalls of the fare free public transport measure. The author has an ambition to analyse the implementation in 2017 and subsequently evaluate the policy.

1.1 The City of Žilina and Tallinn

City of Žilina and its surrounding is dynamically developing region in Slovakia. The main employer is a big foreign car manufacturer KIA Motors, which together with its subcontractors generates about 60 percent of gross turnover in the region [19]. The main employer is located few kilometres from the city, in the adjacent village to which employees commute by shuttle bus. There is relatively significant and gradually evolving IT sector that attracts other companies in the city of Žilina. There is also university located in the city, mostly specialized on technical and IT field. The city is also an important transportation hub, since it is crossed by a number of important road and railway routes.

Since the context of Tallinn is important, following two paragraphs provide brief description of Estonian capital city.

Tallinn is economic, financial, administrative, cultural, political, and historical capital of Estonia. On average, about 50 percent of Estonian GDP is produced in Tallinn and within its surrounding [7]. Several worldwide IT companies and start-ups, above all Skype, have their laboratories and headquarters in Estonian capital city. NY Times described Tallinn as "sort of Silicon Valley on the Baltic Sea" [9]. Due to geographic location near Baltic see, the city is logistic hub. According to the study conducted by European Parliament *Mapping Smart Cities in the EU*, Tallinn is one of the most innovative cities in the European Union with high focus on innovations in public transport and energy saving [12]. There are several universities, mostly dedicated to technology, medicine, biology and business.

It is important to note that Estonia has similar fiscal decentralization as Slovakia. Cities operating with money transferred from central government. Major transfer to the cities' budgets is from income tax. Cities in Estonia as well as in Slovakia have competences to set their own taxes and fees [11].

1.2 The "Free" Public Transport Initiative

The mayor of the city of Žilina has the plan to introduce fare free public transport in three phases. The first phase is to introduce free public transport for seniors over 70 years in October 2014. Next step is to free all retired residents from fares in public transport. This proposal was approved and since December 2015 residents who are older than 62 years do not need to pay fares. The second phase is to introduce fare free public transport for all pensioners. The final phase is to implement fare free public transport for all residents who do not owe any fees of taxes to the city. According to the implementation plan, residents of Žilina will use fare free public transport from 2017 [3].

This plan will be followed and complemented by parallel plan to make the public transport more attractive for inhabitants. Therefore, the city wants to develop and renew the vehicle fleet and infrastructure. This means tendering new trolley buses and buses mainly from European resources (Operational Programme for Transport). In next step the city plans to introduce the system public transport priority over individual automobile transport (i.e. priority bus lines on roads). The system has an ambition to speed up the public transport. Finally, the city wants to increase awareness and comfort of passengers. Hence, the plan is to build intelligent stops, introduce online ticket sales, and online data of arrivals [3].

The mayor of Žilina and his team announced the plan to introduce free public transport in the city few months before local election 2014. They openly said that the main incentive (moreover, it is a popular policy for electorate) was in successful introduction of fare free public transport in Tallinn. Since the discussion and arguments for fare free public transport in Tallinn are important for further analysis, I provide brief summary of the Tallinn case. The capital city of Estonia – Tallinn is the largest city in the world which introduced free public transport respectively fare free public transport for residents. Tallinn, as well as many other cities, faced

an annual decline in number of passengers in public transport. The city has had to substitute the loss on the revenue (ticket sales) side from the city's budget (in total around 500 million euro).

Prior to the introduction of free public transport, the city of Tallinn provided public transport through two companies owned by the city operating with the budget worth about 53 million euro. The revenues from ticket sales were one third of the whole budget, 12 million euro from residents and 5 million euro from non-residents [1]. So, the city of Tallinn needed to substitute at least 12 million euro, approximately 2,5 percent of city's budget. Mayor of Tallinn Edgar Savisaar and his team argued for fare free public transport with arguments such as, increase in mobility of low-income residents and unemployed. They also assumed that people will use extra money for purchasing local goods and services. Salient argument was also about environmental issues and traffic jams reduction [1, 17].
The Tallinn City Government organized the week-long referendum on free public transit conducted among Tallinn residents ended on Sunday with 75.5 percent of participants (20 percent turnout) voting in favour of the idea [16]. Interestingly, similar survey was conducted in city of Žilina on the sample 568 people. Almost 70 percent of respondents would prefer fare free public transport over other means of transport [20].

Roughly, one year after the introduction of the fare free public transport for residents, the representatives of the city presented the results. According to them, the traffic on the busiest crossroads declined by 14 percent and more than 10 thousand new residents were registered in the city. This increase meant for Tallinn additional income about 10 million euro. Moreover, the number of passengers in public transport increased by 13 percent, specifically, males. The proportion of people who mainly use a car for travelling in the city has decreased by 9 percent. More than 20 percent of passengers declared that they use public transport more often than before fare free public transport [18]. Quite impressive numbers.

However, researchers from Royal Institute of Technology in Stockholm, who studied the impact of fare free public transport in Tallinn, present more moderate results. According to them, the demand for public transport increased only by 3 percent, while also other factors (better quality of service, public transport preference, etc.) besides the price for fare had on this increase significant effect. Swedish researchers say that free pricing accounted for increased demand of only 1, 2 percent. Their analysis also shows that traffic speeds in Tallinn had not changed [2]. What basically means that drivers were not shifting over to riding transit as intended. The study stresses that if any shift happened in people's preferences in transport, it is that some people are walking less and using public transport more for short distances. Researchers says that free public transport is a second-best pricing scheme for discouraging automobile use and at the same time less effective than increasing the price for using roads or parking lots [2]. One of the reasons could be that many passengers has had fare free transport (i.e. seniors) or substantial discounts (i.e. students, residents) even before free transport. This is very similar to Žilina, where significant share of passengers also has discounts. These results suggest that fare free transport in Tallinn does not reached set environmental and reduction in traffic goals. However, the study shows the evidence of several social benefits such as increase in mobility of most likely low income and unemployed inhabitants [2]. In other words, the policy of fare free public transport may work, but it is not all solving policy.

US research confirms risks of free public transport policies. According to National Center for Transportation Research (NCTR), fare free public transport might encourage wrong group of people to use public transport, i.e. hooligans, homeless, etc. This may also decoy away target group (automobile drivers, wealthier inhabitants). NCTR research, conducted within 10 years in 40 US cities of different size, shows that in majority of cities the number of passengers rose from 20 to 60 percent. Such an increase was registered only in cities which had public transport service of different nature than big cities. Successful fare-free systems shown in this synthesis serve small cities or rural areas (served limited population). However, the effect of free public transport in large cities with non-homogeneous population has caused a significant increase of

vandalism [14, 15]. It is important to be aware of the size of US cities in NCTR sample. Very small cities had about one million passengers annually, and large cities even more than 900 million passengers annually. In order to get better picture, public transport company in city of Žilina has 11 million passengers annually and in city of Tallinn it was prior introduction of fare free public transport 134 million passenger per year. In sum, there are some risks connected with fare free public transport. For instance, the increase in vandalism, a higher staff turnover rate transport company (due to worse working conditions), increased costs of maintaining safety in vehicles and maintain their technical condition or the increase of local taxation.

Nils Fearnley Norwegian Institute of Transport Economics researcher concludes in his work that the bunch of research papers which have been written in this field come up with ambiguous conclusions. For instance, he points out that The Danish Board of Technology concludes that the free public transport may work in larger cities where the potential for mode shift from car is greatest. Fearnley paraphrase Cervero's finding which says that free public transport works better in central city areas, although the effects are in general small. Contrary, other researchers (i.e. Hodge et al.) say that in big cities there is crowding problem and they suggest that fare free public transport may work more effective outside of big cities [5].

Fearnley offers two model cases when free public transport may be rational and effective. The first is promotion of limited duration. Fare free public transport may be effective when it is introduced for limited time. This type of free public transport then works like a campaign for increasing awareness of public transport in the city. And secondly, when the ticket income is very low (compare to the entire expenditures for public transport). Fearnley says that this was why in several cities in Sweden and Denmark ticketing was removed [5]. In sum, the context matters and policy transfer in case of fare free public transport is not clear-cut.

2   Material and Methods

The presented case study is focused on analysis of official documents dedicated to fare free public transport in the city of Žilina and also analysis of discussion about this measure. Since the Tallinn case is an inspiration for decision makers in city of Žilina, the article provides a comparison of socio economic data of these two cities in order to show several risks of implementation free public transport in city of Žilina.

For the purpose of this paper policy analysis (analysis of existing policy) is used. It is analytical and descriptive approach that attempts to explain policies and their development. Main sources for analysis are politician's statements and publicly available analytical and policy documents and implementation plan. The author is aware that this method has a limited ability to perform economic evaluation of fare free public transport. However, as it is mentioned in the Introduction, economic evaluation may be conducted just after implementation of policy. This article has an ambition to analyse fare free public transport proposal prior the introduction.

3   Results and Discussion

In particular case of Žilina (prior introduction of free public transport) citizens pay for fare, however, the service is also subsided by the city. The city co-finances the service from its budget. Since the city subsidies public transport there are other services which the city can not subsidy. The city has so called opportunity costs. They represent the value of goods or services which the city must to give up - the value expressed in the most favourable possible alternative (i.e. promotion of culture and sport). It is the price of foregone opportunities – decision makers have to decide where to re-allocate the limited financial (also human) resources, to decide what to produce more and what less. The city must do trade-offs. So the decision makers have to sacrifice something (i.e. transfer for ice-hockey team) in order to get something they want or

need now like public transport. Since the decision makers in the city of Žilina have decided for fare free public transport, decision makers have to find additional financial resources (higher taxes, savings, etc.) or to cut financial resources somewhere.

If the public service is provided for citizens free of charge, people are keen to believe it costs nothing. People quickly succumb to the so called Free-lunch illusion – although something seems at the first sight free (zero cost/price), there are always costs needed to be paid by individuals or the whole society. In fact, as Milton Friedman would say, "there is no such thing as a free lunch". Very often these costs are hidden costs or expenses such as negative externalities. This is the case for fare free public transport. People are not aware how much the service provision really costs. Funding for the operation of public transport charged to the total budget of local government, and thus comes from taxes. As Andreas Jonason says in his dissertation about Innovative Pricing, we must be aware that at least in the short term, this tying of all costs only to the public budget limits the financial capacity and forcing cities to savings money in other areas [8]. In other words, there are multiple consequences of this strategic decision.

The mayor presents that the city of Žilina must find 2 million euro as substitute for public transport company. However, his number is less than reality. According to economic analysis, the city needs at least 2,5 million euro to be replaced [20]. Several opposition politicians pointed out, that this amount of money is even higher, because revenue from ticket sales is worth 3,5 million euro [21]. This amount of money is about 5 to 7 percent of the whole city's budget. The mayor wants to find money in better efficiency of tax and fees collection. In fact, according to economic analysis, the city expects to gain 665 thousand euro (positive forecast) for better efficiency in tax and fees collection [20]. In other words, better tax and fees collection makes only one forth of money need.

Another extra money is expected from transfer from the state. Since 2015 municipalities receive 68,5 percent of all income tax revenues as a transfer form national level. Prior 2015 it was only 65,4 percent due to austerity measures (national policy). The city in its economic analysis expects that this share will increase up to 70 percent until 2017 [20]. According to government budget proposal 2016-2018, the share will increase up to 70 percent [13]. Last but not least, the city wants to find the last part of missing money (1,2 million euro) in budget surplus without affecting the scope and scale of currently provided services and development activities [20]. This is the part where the city should think about trade-offs and opportunity costs.

It is important to note that the city can not think in terms of debt increase. There is the law on "debt brake" in Slovakia. If the debt of any municipality will rise above 60 percent of current municipality's expenditures any further indebtedness and deterioration of the financial situation of the municipality would mean financial sanctions or even forced administration [10]. The city of Žilina was one of the most indebted cities in recent years (2009 and 2010). According to INEKO (Institute of Social and Economic Reforms), Žilina has currently good financial health, however, debt is still relatively high 59,7 percent what is above the average of all Slovak municipalities (23,5 percent) [6]. The measure of fare free public transport is not accompanied by proper kind of cost-benefit analysis (In [20] pages 13 to 16). The city calculates economic costs and expected economic benefits, however, the analysis does not include other important non-economic parameters about the effectiveness of policy (e.g. speed of traffic, social and environmental impacts or number new of passengers). The cost-benefit analysis does not put into the contrast the alternatives – status quo and fare free public transport for all residents of the city. Proper analysis of costs and benefits of status quo (or any other alternative) is missing.

In sum, the city has made favourable impression that fare free public transport for residents can be covered by higher efficiency in tax and fees collection, extra income from tax transfer and surplus in the future. The city has not analysed opportunity costs - the price of foregone opportunities. In other words, people would prefer to have more investments in education or culture instead of fare free public transport, if they were aware of real opportunity

costs. Empirical research conducted by experts on public transport shows that the willingness to pay fees, or higher fees for service, is increasing if costumers (inhabitants) are aware of high subsidy [4]. It is also about "Free-lunch illusion" mentioned above - inhabitants are often not aware of total costs for service provision. Last but not least, this approach also limits the financial capacity and flexibility in the short term, especially in situation when the city has very limited capacity to increase debt in time.

The mayor of Žilina knows that he must push forward the free transport policy otherwise failing in fulfilling promise could mean the end of his political career in the city. His political opponents will definitely evaluate his effort and confront him with results. The city of Žilina expects several goal to be achieved through fare free public transport [3]:

- Increase in social mobility of low-income residents
- Reduce traffic jams
- Improve the quality of air
- New residents
- Increase the occupancy rate of vehicles from 41 percent to 80 percent
- Increase the number of passengers in first years by 10 percent
- Increase the efficiency of tax and fee collection
- Decrease the number of cars parking in the city centre.

According to empirical research mentioned in 1.2 chapter above, fare free public transport is quite effective policy to increase social mobility of low-income residents and may be a motivation for non-residents to register for permanent residence. Also the number of passengers may increase, however, there is a risk that these new passengers will not be automobile drivers but rather people who walked prior fare free public transport. In other words, the number of passengers may increase but the traffic speed may stay the same

Table 1. Socio-economic indicators

	City of Tallinn (before introduction of fare free public transport)	City of Žilina
Number of inhabitants	430 thousand	84 thousand
Share on national population	30,7 %	1,5 %
Size in km^2	159,2	80,03
Density/km^2	2 618	1 014
Altitude in meters	9	345
Number of vehicles	480	83
Annual budget on public transport	53	9,5
Lines length in km	763	approximately 225
Mileage in thousands km	29 003	3 517
Number of passengers in thousands	**134 000**	**10 809**
Revenues form ticket selling in million of euro	17	3,5
Budget on public transport in million of euro	**53**	**9,6**
Share of revenue from ticket selling on whole budget	32 %	36 %
Type of company providing transportation	Two public companies owned by the city	Public company owned by the city
Number of non-residents in thousands	**40**	**3**
Budget of the city in million euro	**501**	**51**
Unemployment (2012)	8,6 %	7,8 %
Average salary (2012) in euro	1020	839
Share of people in productive age (18-64)	71 %	73 %
The economy of the city and its surrounding on the GDP of the whole country	**50 %**	**15,6 %**

Source: Author based on annual reports, budgets

The policy proposal in Žilina is based on the case of Tallinn (see comparison in Table 1). This has several pitfalls. First of all, the city of Tallinn has relatively more than three times larger economy. The economy is very important factor because it says about business and job opportunities in the area. These opportunities indirectly mean potential new income to budget of local government. For instance, non-residents who are working in the city but living outside the city can be motivated to register as resident due to fare free public transport for residents. The city of Tallinn has number of potential new residents (who pay income tax) 13 times more than the city of Žilina.

And secondly, the Tallinn's city budget is worth approximately ten times more than the budget of Žilina. What is even more important, the budget of public transport provider is one tenth of whole city's budget in Tallinn but about one fifth on Žilina. This may indicate that the budget of public transport provider in Žilina is too big and inefficient, and there is a room for cost reducing.

Interestingly, Žilina's politicians did not speak much about more similar and appropriate possible inspiration - the city that also introduced fare free public transport for residents – Frýdek-Místek (Czech city). Although Frýdek-Místek is smaller city than Žilina, it is more similar in size, economy, and population than Tallinn. However, it is important to note, Frýdek-Místek provide public transportation in significantly smaller scale than Žilina, what makes them also hardly comparable.

4 Conclusion

The city of Žilina will implement fare free public transport in 2017. Nowadays, we do not have sufficient data for evaluation of fare free public transport initiative. However, this article points out several possible problems or pitfalls in relation with free public transport policy. Firstly, significantly weaker economic strength of Žilina compare to economically dominant Tallinn in Estonia. For instance, the number of non-residents living in the city who can be motivated to became proper residents (additional income to the city's budget) of the city is 13 times higher in Tallinn than in Žilina. Secondly, different financial capacity of cities. After introduction of fare free public transport almost one fifth (only 10 percent in Tallinn) of the whole budget of Žilina city will be spent in public transport. The city of Žilina has a room for reducing of cost and increasing efficiency in public transport company.

As it is mentioned in the Introduction, this paper should be perceived as an initial phase for the future research in this field in Slovakia. The city decided to implement fare free public transport without affecting the scope and the scale of other provided services and development activities. The policy proposal in Žilina is based on the Tallinn's free public transport policy. Politicians in favour of the policy (the mayor especially) do not analyse opportunity costs - the price of foregone opportunities. The measure of fare free public transport is not accompanied by proper kind of cost-benefit analysis. The city calculated economic costs and expected economic benefits, however, the analysis does not include other important non-economic parameters about the effectiveness of policy (e.g. speed of traffic, social and environmental impacts or number new of passengers). The analysis does not analyse the alternatives (i.e. status quo).

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Intermunicipal Cooperation and Local Cost Efficiency: The Case of Waste Management Services in the Czech Republic

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Abstract

The analysis presented here follows the theme of intermunicipal cooperation and constitutes a systematic test of impact of intermunicipal cooperation in the Czech Republic. Our empirical analysis used linked open data and data from the survey of Czech municipalities to examine the dynamics of intermunicipal cooperation in the market of solid waste, which is one of the most relevant local services.

The main objective of this contribution is to examine whether intermunicipal cooperation has an impact on waste management cost efficiency and can reduce costs on sample of 670 municipalities in the Czech Republic, specifically the South Moravian Region. Results of analysis show dependence between intermunicipal cooperation and costs and confirm the assumption that the municipalities can reduce cost through cooperation.

1 Introduction

Although efficiency of public service delivery is not any new research topic, the economic crisis that began in 2007/2008 has brought, inter alia, a kind of worldwide 'research tsunami' focused on the efficiency at all levels of government. At the same time, austerity and fiscal crisis make the search for cost saving reforms in local government more critical.

Factors like competition, mode of production, ownership, economies of scale or privatization have been investigated very intensively [2], [8], [10], [12], [14-15], [19-26], [29-32]. In the last decade, greater attention is paid to the cooperation as a factor of local cost efficiency (e.g. [1-7], [10-11], [13], [16-18], [29], [32]). It´s also because of the fiscal crisis intensified the need for local governments to rethink service delivery in order to increase the efficiency of locally provided services and costs and started to use new forms of intermunicipal cooperation. Shared services delivery is a widespread phenomenon, and is particularly intense in small municipalities [2], [5].

While supporting the intermunicipal cooperation, most of the authors keep in mind the area of waste management services. Indeed, solid waste is among the services with largest impact on local government expenditure (local expenditure on solid waste management from 2012 to 2014 was more than 60 % of current expenditure on environmental protection, and accounts on average for 3 % of total current municipal expenditure in the Czech Republic, and it has received extensive attention in the literature extensive (e.g. [2-7], [10], [13], [29], [32]).

In the field of waste management services most of the authors keep in mind reducing of waste management costs [2-4], [6], [10], [32]. However, for instance, the intermunicipal cooperation aimed at solid waste in the Norwegian environment caused a reverse effect, i.e. the intermunicipal cooperation increases the costs [29]. Within this context, we can mention the classical 'Dahl-and-Tufte-dilemma' which stipulates that the larger municipalities tend to be more effective providers of various local services, and, on the other hand, the smaller municipalities tend to be more democratic. On the contrary, while the larger municipalities are less democratic, the smaller municipalities are less efficient [9]. Taking into account the public

choice theory and the theory of economies of scale, an extremely fragmented structure of the local (self-)governments may be understood as advantageous in terms of quality of local democracy. For instance, a statement: 'small is to democracy as large is to efficiency' [11] has become one of the most common basis for various research assumptions.

It seems that economies of scale exist for small local governments, but not for larger ones and because of this, small local (self-)governments benefit more from co-operation than larger ones, as the former ones are more likely to achieve a reduction of the average cost of service delivery [7]. The same is pointed out by other authors who stresses that the intermunicipal cooperation can serve as one of the surrogates or functional substitutes for territorial consolidation under the conditions of small units and fragmented local structure in particular [18]. In spite of the intermunicipal cooperation is relatively widespread theme of research papers, there is lack of the research of this field in the Czech Republic that is able to mirror the specificity of the Czech Republic. Therefore, we have decided to investigate this issue namely in the area of waste management services. In addition, due to its universality (it is very common in the countries of the OECD that the local governments deal with the waste management).

Our research questions were:
a) Which forms of intermunicipal cooperation are in the field of waste management in the Czech Republic?
b) What role does intermunicipal cooperation play in local waste management cost savings?

More precisely our research issue is to examine whether intermunicipal cooperation has an impact on waste management cost efficiency and can reduce costs.

The paper is structured so as to present the answers to our research question. In the first part of the paper we analyse the literature on cost savings under cooperation and investigate situation of intermunicipal cooperation in waste management market. The second part presents the results of regression analyses. The final part discusses the results and formulates conclusions.

2 Material and Methods

The research has been performed with respect to data collected for year 2013 and sample consists of 670 municipalities located in the Czech Republic, the South Moravian Region. The linked open data on municipal areas and populations from the Czech Statistical Office (CZSO) and the linked open data on municipal solid waste expenditures/costs (MSWE) from the Czech Ministry of Finance's ÚFIS database have been used for the analysis. The data relating to waste collection companies and inter-municipal cooperation have been obtained via a questionnaire-based survey. The survey was carried out from September 2014 to the end of January 2015.

In order to compare our results with econometric studies published elsewhere (e.g. . [2-7], [10], [13], [29], [32]) the techniques applied in this article are the similar as those used in the abovementioned studies. The basic function of the municipal solid waste expenditures (cost) takes the following form:

$$TC = f(P, D, R, L, M, C) \qquad (1)$$

The dependent variable, which we shall call *TC*, is the total municipal cost paid for solid waste services in the municipalities of the South Moravian Region in the Czech Republic. It includes collection, transportation, and disposal or treatment. The total costs incurred by the municipality are determined by the population of the municipality (*P*) [a proxy for the amount of waste generated] and variables that affect the requirements of input (*D*, *R*, *L*, *P*, *C*). A more precise description of this model, based on the cost function (1) given above, is:

$$TC = \beta_0 P_i^{\beta_1} + D_i^{\beta_2} R_i^{\beta_3} e^{\beta_4 L_i + \beta_5 M_i + \beta_6 C_i + u_i} \qquad (2)$$

As in [2-3], [6], [7], [12], [30] the double logarithmic form of the equation has been estimated:

$$TC = \beta_0 + \beta_1 \log P_i + \beta_2 \log D_i + \beta_3 R_i + \beta_4 L_i + \beta_5 M_i + \beta_6 C_i + u_i \quad (3)$$

The TC is specified as the dependent variable in the most of relevant literature (e.g. [2-4], [6], [8], [10], [12-13], [19], [21-22], [29-30], [32]). However, one can find much colourful picture in regard to so called explanatory variables. In the case of our study, we have dealt with the following ones:

- **Population of the municipality** (P) - Information on generated waste could not be obtained from all municipalities. Very small municipalities did not have information on the amount of generated waste. In addition, study of Soukopová et al. [27] showed much clear TC-dependency on population than the generated waste. This variable was recently used also by [4] or [6].
- **Population density** (D) - We took a population density measured in inhabitants per square kilometer. A higher density could decrease total waste cost, but, for instance Bel and Mur [6] notified that the higher concentration of population should lead to greater problems of traffic congestion. However, we expect the negative final effect of this variable.
- **Percentage of recycling** (R) - This variable is defined as the amount of recycled waste per amount of total solid waste. We expect that the costs increase with the percentage of recycling, and we have based our assumption on existing evidence [20].
- **Landfill in municipality** (L). Transportation costs between the municipality and the disposal place represents an important part of the service's costs. This variable is constructed as dummy and takes value 1 if the landfill is in the municipality and 0 otherwise. In the sample is no municipality with the landfill in its area. We expect according to [2], [6], [8] the effect of this variable on costs is negative.
- **Mode of production** (M) - This variable captures the influence of either public or private production of service on costs. It is constructed as a dummy variable and takes the value 1 if the service is delivered by a public company, and the value 0 in the case of private production. The expected effect is ambiguous: as it has been already pointed out, some researchers have found a negative relation [22] between the public production and the costs, someone others have found a negative relation between the private production and the costs [21], while others have not found any conclusive evidence at all [8], [12].
- **Intermunicipal cooperation** (C) - In order to assess the influence of the intermunicipal cooperation on waste costs we use variable Coop as a dummy that takes value 1 if the local government is significantly involved in inter-municipal cooperation (as a member of various cooperation forms, e.g. conferring a duty to another entity of local government, a joint provision/production of a service by a partially autonomous institution, a joint provision of a service by an autonomous legal person governed by public law, etc.), and 0 if not. We assume that municipalities tend to cooperate in order to achieve a reduction of costs, and therefore a negative effect of variable is expected.
- Numerous studies (e.g. [2-4], [6], [8], [10], [12-13], [19], [29-30], [32]) used as a dependent variable also collection frequency. However, due low significance we have decided to refuse its use.

Table 1 shows descriptive statistics for the model's variables.

Table 1. Descriptive statistics of variables in the model

Continuous variables	Mean	Standard deviation	Min.	Max.
TC [CZK]	1,147,555.77	2,948,937.04	23,283.00	40,397,529.00
P [inhabitants]	1,181.58	2,559.13	36.00	33,805.00
D	1.05	1.29	0.08	21.23
R	0.24	0.14	0.03	0.99
Discrete variables		Percent 1	Percent 0	
L		2.3881	97.6119	
M		32.3881	67.6119	
C		44.1791	55.8209	

Source: Authors

Obviously, we are aware of limits of our research. Despite the fact that our research sample is large, we have conducted our research only in one of the Czech regions. Furthermore, our data are linked to the field of waste management, and therefore further research activities aimed at delivery of other local services should be conducted in order to discuss 'production-provision' dilemma at the local level in more detailed way. Last but not least, we have not provided with any empirical international comparison and it means that our conclusions are rather country-based. Taking this point into account it is necessary to understand our conclusions in a broader context of existing as well as forthcoming research.

3   Results and Discussion

As is shown in the table 2 the intermunicipal cooperation in the field of waste management is of voluntary nature in the Czech Republic, and therefore one can find a few legal cooperation forms which are used for this purpose by the relevant local governments (see table 3). In the table 2 we compare the frequencies of each production form in the South Moravian Region for 2013. To this aim, we have divided the sample between municipalities with cooperation and municipalities without cooperation.

**Table 2. Intermunicipal cooperation and production form
in the Czech Republic, South Moravian Region (in %)**

Production form	Intermunicipal production	Municipal production
Private firm	0.917	68.996
Mixed firm	0.917	13.527
Public firm	98.165	15.502
Direct public management	0.000	1.965

Source: Authors

Legal form	Subjects with right to participate	Law containing the relevant legal provisions	Common name/s of the cooperation form	Use in the field of waste management
Agreement on fulfilment of specific task	Local governments	Act No. 128/2000 on Municipalities as amended	-	Yes (1 case, 2 municipalities)
Agreement on establishment of voluntary union of municipalities	Local governments	Act No. 128/2000 on Municipalities as amended	Voluntary unions of municipalities	Yes (7 cases, 130 municipalities)
Joint legal person of local governments	Local governments	Act No. 513/1991 Commercial Code as amended	-	Yes (1 case, 81 municipalities)
Business partnership	Individuals and legal persons	Act No. 513/1991 Commercial Code as amended	-	Yes (1 case, 4 municipalities)
Local public benefit company	Individuals and legal persons	Act No. 248/1995 on Local Public Benefit Companies as amended	Local action groups	No
Interest association of legal persons	Individuals and legal persons	Act No. 40/1964 Civil Code as amended	Euro-regions, associations of municipalities, local action groups, Union of Towns and Municipalities of the Czech Republic, Healthy Cities of the Czech Republic	No
Agreement on association	Individuals and legal persons	Act No. 40/1964 Civil Code as amended	Euro-regions	No
Civic association	Individuals and legal persons	Act No. 83/1990 on Association of Citizens as amended	Local action groups	No

Source: Authors

Alongside with the private contracting, where the local governments enter into the agreements with external private service providers and outsource the service/s, the local governments which have been included into our sample use especially the joint provisions/productions of the service by the partially autonomous institutions. In fact, almost two thirds of the examined local governments have entered some form of the intermunicipal cooperation, and from this perspective the intermunicipal cooperation in the field of the waste management can be described as a common phenomenon in the Czech Republic.

It is interesting that public firms prevail in the field of intermunicipal cooperation in the waste management market in the Czech Republic. These results don´t correspond with the research of Bel and Fageda [3], who noticed, that public firms covered with 51.3 percent in the waste management market and public firms only 16.5 percent.

Obviously, popularity of the intermunicipal cooperation in the field of waste management does not automatically mean that a cooperation-based design of delivery of this service is the best one also in terms of efficiency.

The results have been obtained from the estimation of the equations by using STATISTICA 12.0 statistical software. Robust White error estimation has been calculated to account for a

possible problem of heteroscedasticity, to the extent that there are systematic differences in the scale of the variables considered for each municipality. Table 4 shows obtained results for the sample of municipalities from the South Moravian Region.

Table 4. Empirical results from the estimation of total cost equation

Variable	Coefficient	Coefficient (stepwise regression)	Hypothesis	Real effect
Constant	5.8868***	5.8728***		
	(0.1773)	(0.1629)		
P (log)	1.1172***	1.1186***	+	+
	(0.0248)	(0.0246)		
D (log)	-0.1285***	-0.1302***	-	-
	(0.3245)	(0.0321)		
R (log)	0.0604		+	+
	(0.1227)			
L	0.2536**	0.2674**	-	+
	(0.1273)	(0.1243)		
M	0.0062		Ambiguous	+
	(0.0584)			
C	-0.131***	-0.1236***	-	-
	(0.06)	(0.0374)		
R^2	0.8716	0.8721		
Adjust R^2	0.8703	0.8713		
F-test	634.42***	1,123.20***		
N	654	659		

Note: Significantly different from zero at 99% (***), 95% (**), 90% (*)
Source: Authors

Results indicate that the explanatory power of the model is high, over 87%. This results is common in studies taking the total cost as the endogenous variable, as [3], [10], [12], [28], [30]. The F-test indicates that all variables are jointly significant at the 1% level.

Population has very significant relation to cost, over a 99% confidence level and its coefficient is slightly over 1. Landfill in the municipality was confirmed as the second strongest variable with impact on local waste management costs, but it has not so strong significant relation to cost, over a 95% confidence level. Intermunicipal cooperation has very significant relation to cost, over 99% confidence level, but its coefficient is lower. Also population density has significant relation to cost, over 99% confidence level. Other variables have not significant relation to cost.

As it has been estimated, the most explanatory variables have confirmed our assumptions, e.g. larger population of the municipality increases the total waste costs, a higher density decreases the total waste costs, the intermunicipal cooperation decreases the total waste costs, etc. Nevertheless, a surprising result has been achieved by the variable L landfill in the municipality. Despite the fact that a negative dependency was expected in compliance, for instance, with [2], [6], [8], the results have confirmed rather positive dependency. This may indicate greater role of landfill/incinerator price than the existence on the municipality area.

4 Conclusion

Although the more results show the positive effect of intermunicipal cooperation on cost savings, recent evidence on the cost savings from intermunicipal cooperation in local service delivery has become ambiguous. Therefore this contribution studies the effect of intermunicipal cooperation on local costs. We selected waste management services because there is a lack of the research of this field in the Czech Republic. In addition, due to its universality, availability of the

data, and pretty intensive research activities in the last decade (e.g. 2-8], [10], [12-13], [17-20], [23-28], [30]) this theme offers us interesting material for comparisons.

Taking into account our empirical results it seems, that the waste management belongs to the local services where the provision by means of various cooperation forms lead to much higher efficiency than its production. A cooperation behaviour of the local governments is supported also by the fact that the in-house provision or production is always less efficient than other forms of this service delivery. Obviously, if one wants to speak about efficiency of delivery of the local services in the Czech Republic in general, it is necessary to take into account also other local services and their delivery. From this perspective, a further research focused on the delivery of local services in the Czech Republic seems necessary.

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Implementation of Quality Principles for Public Services Providing

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Abstract

Increasing the quality of production belongs to management goals of every company, be it quality of products or services. Higher quality of production is reflected in e.g. obtaining competitive advantage on the market or as effective area administration, returning customer or a citizen satisfied with public administration services etc. Management therefore strives for higher quality and resulting financial as well as non-financial profitability. The request for quality improvement is a part of defined standards, complex methods and tools for quality management. Public administration needs to be perceived from two angles, on one hand it is public administration as a whole, on the other hand it consists of particular organizations and their services. If we view public administration as a whole, the requirement for quality improvement and quality methods implementation is declared by strategic documents or presented within the "National Conference of Quality in Public Administration". From the viewpoint of public administration as a set of partial (smaller) organizations, the requirement for quality is often declared but not supported by system approach. This paper deals with implementation of quality principles in providing public services by partial organizations of public administration.

Keywords: public administration; public services; quality management; quality principles

JEL Classification: H00, H70, R5

1 Introduction

The need to increase quality is necessary in private as well as in the public sector. The reasons for the organization management to be interested in quality of their production include: pressure from competitors, reflecting technical development to products or services, pressure of well-informed customer, danger or health hazard resulting from product complexity, risk of sanctions, need for economical production etc. This list is oriented mostly on private organizations, however, the quality improvement methods can be used also in the public sector [21]. Such managerial approaches include e.g. quality management concept TQM (Total Quality Management) [2] [14], Excellence Model EFQM (European Foundation for Quality Management) [3] [5], CAF framework (Common Assessment Framework – Improving an organization through self-assessment) for improving organization by self-assessment within public administration [4] [12], ISO norms 900X of quality management system.

Quality approaches for public administration are delimited in strategic documents which include "Strategy of the National Strategy Policy for 2011 – 2015" [13], document "Efficient Public Administration and Friendly Public Services for 2007-2015" which is followed by document "Strategic Framework of the Development of Public Administration in the Czech Republic for 2014 -2020" [10] [18]. The documents declare the need towards improving the public administration and quality of its services. Verification is recommended by methods such as CAF, ISO, benchmarking, Balanced Scorecard [16]. In accordance to these recommendations concrete projects are realized. The pilot CAF project was realized at selected regional administration authorities which carried out repeated yearly self-assessment within defined criteria. The CAF framework is usually implemented at individual organizations of public administration where experience and outputs are presented e.g. within conferences "National Conference of Quality in Public Administration". The above listed documents put emphasis on the necessity of process approach to organization management. In accordance with this

requirement project PMA I "Process Modeling of Public Administration Agenda" has been realized since 2009 and will be followed from app 2016 by a project for support of standard setting for public administration agenda performance. It can be summarized that the public administration as the whole, respectively the Ministry of Interior, declares the long-term need of managing quality in public administration and methodically leads concrete projects. At the same time, this might not demonstrate at particular/partial public administration organization as using CAF models is voluntary and realized process modeling of agendas only initiates the necessary starting environment for quality management implementation. Partial organizations of public administration need to approach systematically to measuring and increasing quality, at the same time in such a way which does not bring additional burden.

2 Material and Methods

Requirement of quality management in public administration has long declared. This is the approach of public administration as a whole and lays the groundwork for quality management. However, the public administration as whole is composed of many partial / smaller sub-organizations. The question is which way small organizations can implement quality management and at the same time in such a way that does not burden them. Quality methods generally are based on common pillars as those are – customer orientation, fact-based decision, process approach, management leadership, employees as knowledge owners, mutually beneficial partnership. Apart from these, the concrete methods accent different particular viewpoints or approaches to quality management (waste elimination, effort for perfect production, focus on continuous improvement etc.). Some of the quality methods were originally intended for profit organizations, nevertheless, they can be applied also in the public sector. Such examples are Six Sigma, Kaizen, Lean Production [7] [19]. The Six Sigma method is focused on increasing quality with emphasis on defect elimination [20]. The method strives for production perfection, i.e. avoid mistakes. A mistake is perceived as any state when the customer is dissatisfied [17]. The Kaizen method represents continuous improvement approach; it is a flow of partial improvements on all levels of an organization [9]. The central principle of Kaizen is a quick analysis of the small, manageable components of a problem and rapid implementation of a solution with ongoing, real-time reassessment [6]. Lean Production approach is focused on waste elimination, respectively decreasing the extent of such activities which do not add value to the production and product [1]. The listed quality methods represent complex approaches to quality management within an organization. If an organization applies a selected a quality method, it means significant requirements for method implementation, activity organization, employee training, changes in work instructions, as well as finance requirements. Thus, method application is all-in-all desirable, however, it is a demanding project. Solution for organizations is to implement partial principles of these methods. The proposed solution has been proven in real-organization.

2.1 Voice of Customer Principle

This principle is related with the fact that customer's voice is the priority for quality management, be it external or internal customer. The norm CSN EN ISO 9000 defines the term "satisfied customer" as customer perception related to the level of fulfillment of his/her requirements. In order to measure customer satisfaction the organization needs to define who the customer is and define customer requirements and definition of customer satisfaction [11].

This principle states the fact that improvement, respectively any activity, should be carried out by a sequence of consequent phases. These phases include – initial problem definition, obtaining available information, problem analysis based on obtained information, solution options proposal, selection of suitable option, solution implementation, results verification and standardization of the process. Models working on this principle include PDCA (Plan, Do, Check, Act) and DMAIC (Define, Measure, Analyze, Improve, Control) [11]. Methods CAF and Kaizen propose PDCA cycle usage, Six Sigma works with DMAIC. The CAF method uses the PDCA model for evaluating the level of a particular criterion (see Figure 1).

Figure 1. Using the PDCA model within CAF framework
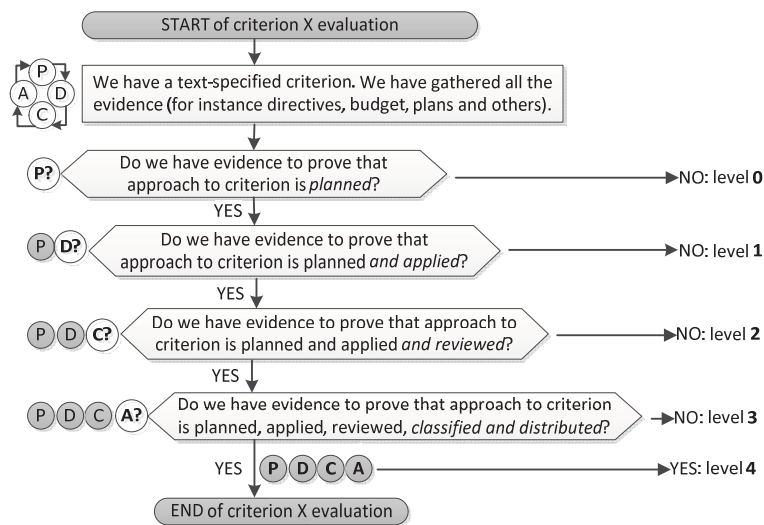
Source: Authors based on [12]

2.3 Evaluation Principle

The principle is linked to the requirement of decision making based on facts, using data from sources as information systems, social networks etc. [15]. The CAF framework and Six Sigma method propose repeated evaluation of the monitored process status. The organization first measures the default process status using a recommended method and expresses this by the measured value. After that changes leading to improvement are designed and implemented. It is verified by a new measurement and expressed by reached value whether an improvement has really taken place. The CAF and Six Sigma methods approach evaluation differently. CAF evaluates selected criteria in line with the PDCA cycle. Criteria for evaluation are set based on the CAF method and for every criterion evaluation standards are recommended. E.g. criterion "Continuous identification, designing and managing key processes" has evaluation standards "continuous identification and documenting of key processes", "assigning sources based on their contribution to strategic organization goals fulfillment" and others. The commission collects proofs about the results and based on those the criterion will be evaluated. The criterion will be given a score based on the stage of the PDCA cycle where the criterion is positioned (Figure 1).

The method Six Sigma uses mathematical apparatus of Gauss; his normal distribution curve describes how probability is distributed. Sigma is determined as standard deviation. Base of it are limits which are determined based on customer's requests – upper and lower specification limits. The area inside limits represents suitable outputs and area outside limits represents defective outputs. Processing and evaluation of indicators is performed. They are calculated discrepancies rate (MN), defects per opportunities (DPO).

$$MN = \frac{number\_of\_defects}{total\_number\_of\_executions} \qquad (1)$$

$$DPO = \frac{number\_of\_defects}{total\_number\_of\_defect\_opportunities} \ (2)$$

The Six Sigma method is originally meant for production organizations. Nevertheless, rate of defects / variances can be measured for any product or activity. Variance in non-production organization can be defined as, e.g. – mistakes in process of filling in a form, number of incorrect switchovers of telephone calls, number of cases of outstanding contracts in time and so on.

The methods of evaluation in methods CAF and Six Sigma differ in the level of objectivity. CAF evaluates the criterion based on collected proofs and achieved phase of PDCA, however, the assigned score is subjective to a certain extent. Six Sigma objectively evaluates the monitored criteria, which requires long-term data collection for the criteria which is very demanding from the time and organization perspective.

2.4 Visualization Principle

This principle is related to the need of enterprise reality analysis by help of models. Two groups of models are frequent; process maps and root cause analysis models. The first group of the models, process maps, serves to analyze process status and is created using various graphical tools. The examples are – SIPOC tool for description of process characteristics (Supplier, Input, Process, Output, Customer), diagram VPM (Value Stream Mapping) for identification which activities add/do not add value for production. Method Six Sigma recommends SIPOC diagram, Lean Production uses VPM diagram. The other listed group of models serves to analyze customer expectations (Voice of Customer) and to analyze the root cause of problems. Examples include – Tree Critical to Quality, Diagram Cause and Effect. The data which was identified by Voice of Customers determination is basis for construction of the Critical to Quality tree. Causes and indicators Critical to Quality (CTQ) are analyzed with help of the Cause and Effect Diagram, definition of causes and effects has to capture the root cause. Causes need to be weighted (e.g. by assigning points); such causes are searched for which will influence the whole problem the most. Quality methods Six Sigma, Lean and Kaizen use CTQ, Cause and Effect diagram and others.

As mentioned the proposed solution has been tested in real-organization. The Labour Office of the Czech Republic is structured into regional branches. These regional branches carry out their agenda through contact centers – these are Local Offices of the Labour Office of the Czech Republic. One Local Office was selected for several reasons. It represents a partial organization of public administration, authors are familiar with that environment, management of the organization was interested in the implementation of quality approaches. Implementation of quality principles covered the period 6 months, it were used real data and documents, workers of the organization participated in the processing of models as well as in the evaluation.

3   Results and Discussion

Quality management in public administration can be characterized from two perspectives:

- public administration as a whole: strategic documents declare the need to manage quality in public administration; concrete "central" projects are realized.
- partial/individual public administration organizations: "central effort" might not be visible as the realized agenda process modeling only initiates default environment for quality management implementation; existing quality methods (CAF, Six Sigma, Kaizen, Lean etc.) are extensive and their usage is demanding (organization, labour, time etc.).

Individual organizations of public administration need to approach measuring and increasing quality systematically and at the same time in such a way that does not burden them. The solution is to use fractional principles of quality methods.

This text proposes a concept of quality management in smaller organizations of public administration with focus on following areas:
- Phase A: Customer characteristic and satisfaction measurement.
- Phase B: Process (activity) mapping in organization.
- Phase C: Document management.
- Phase D: Self-assessment.
- Phase E: Broadening of the quality management concept.

3.1 Phase A: Customer Characteristic and Satisfaction Measurement

The proposed concept for customer satisfaction defines four steps as – A1) Characterize customer, A2) Define the requirement area and for each area define the criteria of customer satisfaction, A3) Based on satisfaction criteria create a questionnaire for questionnaire survey, A4) Evaluate the survey and implement actions for improvement.

Let us work with a real example from the Labour Office where this process was verified.

Ad A1) External customers of the Local office of Labour Office were defined as: employers of all categories and physical persons divided into job applicants, job seekers, impaired persons with the right for work rehabilitation and other physical persons who request information

Ad A2) Defining the criteria of satisfaction for the employers was coordinated by the manager of job market department, for the physical persons by the manager of job mediation and consulting. Following text focuses on "employers" group of customers. After consultations a table with description of requirements and satisfaction criteria was made (see Table 1).

Table 1. Criteria of customer satisfaction of the Local Office of the Labour Office

Area	Criteria of satisfaction - characteristics
Requirements on process	I: Relevant reaction of the Labour Office employees
	II: Receiving full and correct information
	III: Help in solving human resources problems
Requirements on output	IV: Quality of events organized by Labour Office (seminaries, labour markets)
	V: Simple way to post a requirement for an available job
	VI: Quality of pre-selection of applicants by Labour Office
	VII: Selected people generally fulfill requirements
Requirements on documents	VIII: Advantageous conditions to obtain a subsidy for employee wage
	IX: Simple and clear rules for request administration

Source: Authors

Ad A3) Further a questionnaire was prepared where each satisfaction criterion was surveyed. The method of data collection was through a survey during face-to-face visit carried out by the employees of the Labour Office within improving cooperation with employers.

Ad A4) Results of the survey should be presented to the employees of the organization. Top management should implement measures especially to improve the worst rated criteria.

3.2 Phase B: Process (Activity) Mapping in an Organization

Figure 2. Basic process map of Local Office of the selected Labour Office, partial map
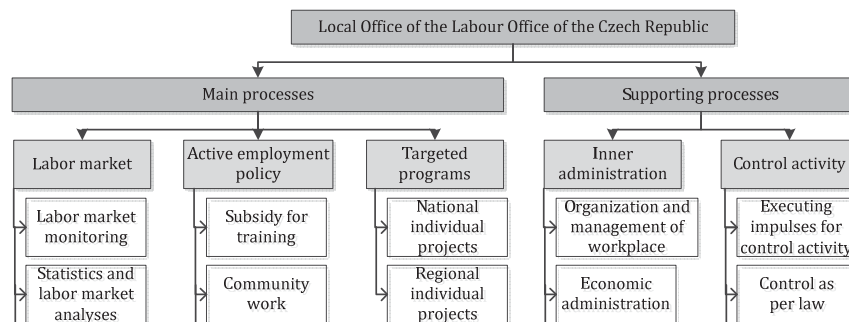
Source: Authors

Basic process identification enables an organization to realize which processes are the main and which supporting. At the same time a process map might express inner process characteristics such as – inputs, outputs, activities within process, owner, customer, goal, etc. For illustration, let us continue in the model example. See the basic overview map of processes for Contact Point of the Labour Office (see Figure 2). The process model serves as initial mapping of status quo as well as background for further more detailed process mapping.

3.3 Phase C: Document Management

Document management means that all results of organization's activities will be kept at defined places so that employees with relevant rights can access them and within minimum time find proofs about realization of already completed tasks [11]. Lifecycle of a document can be divided into three phases [8] – input (acceptance or obtaining of the document), processing (saving, modifications, using of the document), and output (publishing, archiving; and in the end shredding). Within a document life cycle following roles can be distinguished – a role "originator" represents the person who creates the document; a role "approver" represents the person who controls, approves and is responsible for update, a role "user, responsible person" is the person who uses the document and at the same time is responsible that it will be accessible for all employees who need it and use it for their work; is also responsible for document handling and subsequent archiving, if needed also shredding.

The proposed concept for document management defines following steps – C1) Carry out a survey of documents used within an organization, C2) Communicate results of above to organization management, C3) Finalize list of documents, standardize documents.

Ad C1) For illustration let us continue in the case study. The output of the document survey was presented using a table (partial example – see Table 2). In total 26 documents were identified within the organization, out of which 20 official, 2 unofficial and 4 new.

Document	Type	Originator	Approver	User, Responsible person
Organization structure	Official document	Branch director	Regional Director	Branch Director Office Leader
Announcement on mass redundancies	Unofficial document	Job Market Analyst	Job Market Department Manager	Originator
Form for provided services evaluation	New document	Assistant	Department Manager	Originator

Source: Authors

Ad C2) At the workplace manager meeting the list was revised and the final list of official documents was approved.

Ad C3) All managing employees were instructed to ensure document standardization used in their departments.

3.4 Phase D: Self-assessment

It is important that an organization carries out repeated self-assessment in which the achieved level is quantified in a form of objective statement.

The proposed concept for self-assessment defines these steps – D1) carry out simplified self-assessment based on CAF model selected criteria, D2) Based on the results from self-assessment propose and carry out improvements.

Ad D1) The proposed concept recommends following questions for evaluation – "Is the strategy of organization defined? Is organization structure defined? Is there an employee evaluation system in place? Are goals and tasks defined based on SMART principles? Is concept of human resources management in place? Is control system of finance management set up? Is handing over knowledge among employees set up? What are the results of customer satisfaction surveys? How do employees perceive the organization? Is it an attractive workplace? What is the quantity and quality of produced goods/services?" It is important that individual criteria are evaluated based on the collected proofs based on the PDCA cycle. For illustration we will continue with the case study. For every question a "Criterion Card" was created (see Figure 3).

Figure 3. Example of a filled-in "Criterion card" of the Local Office of the Labour Office

Criterion 6	Is control system of finance management set up?		
Current status description	Internal control system is derived from the internal acts and legislation. The correctness of the setup is evaluated but changes are small or none.		
Proofs	Legislation, internal managing acts		
PDCA phase	Phase C (check)	Score	3

Source: Authors

The self-assessment was carried out by managers of selected departments. The outputs of the self-assessment are obtained values for all evaluated criteria. The organization gives itself feedback on what needs to be improved.

Ad D2) Based on the self-assessment areas for improvement were defined as follows – better work with employees, focus on processes leading to outputs and providing service as such. Further topics for improvement were specified as follows - set up a concept of human resources management, secure know-how transfer among employees, measure work environment attractiveness from the employee viewpoint, complete organization strategy covering all areas, set goals and tasks in line with the SMART principle, monitor and measure quality of provided services.

The report was approved by the manager of the Local Office and became the base for plan setting. The plan includes 6 partial tasks, each of which has a target and responsible person, e.g.:

- Task 1: set the conception of human resources management.
- Goal: set up a simple concept of HR management – employee education, monitoring personal needs of the organization, employee motivation.
- Responsibility: supervisor of director's office.
- Regular self-assessment was scheduled at the management meeting with frequency every year to months after customer satisfaction survey evaluation.

3.5 Phase E: Broadening the Concept of Quality Management

The basic proposed concept for quality management in a partial organization of public administration includes four areas which are – customer satisfaction survey, process mapping, document management and self-assessment.

Listed areas need to be tested regularly, e.g. once per year. This system approach will provide the organization an objective background for quality management. The monitored areas should be gradually broadened by using further tools such as:

- Customer satisfaction survey: use diagram CTQ and diagram Cause and Effect for satisfaction criteria identification,
- Process mapping and analysis: create more detailed process maps expressing process characteristics,
- Self-assessment: when using the CAF model for self-assessment increase the number of evaluate questions by further topics; or transfer to a more objective approach to evaluation based on the Six Sigma method.

4 Conclusion

Increasing quality of provided services is constantly declared within the public administration of the Czech Republic in both ways, by being anchored in strategic documents as well as by realizing concrete projects. However, this effort might not be visible at individual (partial, small) organizations of public administration as the realized agenda process modeling only creates the initial environment for quilt management. Partial organizations need to approach measuring and quality management systematically and at the same time in such a method which does not burden them. There are quality methods (such as CAF, Six Sigma, Kaizen, Lean) which are vast and their use is demanding. The solution is to use only selected principles of the quality method. This paper provides a concept of quality management which focuses on following areas - customer satisfaction measuring, process mapping, document management and self-assessment. Each area uses a certain principle from the quality methods and the proposed approach is verified by being implemented in a selected organization. At the end tools are proposed for further broadening of the concept. The proposed concept represents a system approach to quality management in partial organizations of public administration; it provides objective outputs as a background for improvements and is in harmony with the declared trend of quality management in public administration as a whole.

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The Association between Land Take by New Development and Land Fertility: Are Environmental Charges Effective?

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Abstract

One of the negative effects of sprawl is land take by new development and interconnected decrease of available agricultural land, eventually forest land. An even more serious problem is the loss of precious agricultural land with high level of fertility. The aim of the paper is to assess, if the charge for the conversion of agricultural land has a statistically observable impact on the decision-making of investors in terms of the location of new development according to its agricultural potential. To test the association between land take by new development and land fertility, multiple linear regression is used. As results show, we face the loss of agricultural land mainly in districts with relatively higher land fertility. The charge for the conversion of agricultural land seems to have no impact on the decision-making of different stakeholders.

Keywords: land take; land fertility; environmental charges

JEL Classification: Q38, R52

1   Introduction

To enhance the protection of precious agricultural land from excessive development, the charge for the conversion of agricultural land was implemented in 1990ies in the Czech Republic. The idea behind this charge resembles the aims of development taxes. Development tax belongs to a broad family of market-based instruments of environmental policy which seek to slow down the land take and protect biodiversity and ecosystem services besides traditional regulatory instruments (cf. [10]; [11]; [17]; [20]).

Development tax is designed to decrease land loss, from the efficiency point of view ideally to a socially optimal Pigouvian level. According to [16], the tax imposed on an activity should reflect the marginal social damage generated by it. Development taxes therefore should reflect the marginal social value of the open space lost by the conversion of open space to urban use. Demand for land development is supposed to decrease based on these taxes ([10]; [2]). Baumol and Oates [1] find a number of shortcomings of Pigouvian proposal which hinder its practical application –the height of marginal social costs present in the optimal situation might be different from the current marginal social costs height. Moreover, many efforts have been taking place to evaluate social costs – e.g. the social costs of the loss of ecosystem services, such as the provision of recreation opportunities for public (e.g. [21]; [14]; [9]). To find this social value is in practice unfeasible however. The results of social value research are not robust, and vary to a high extent according to chosen methodology [19]. For these reasons, it is problematic to incorporate these results to environmental policy as inputs for Pigouvian taxes.

The charge for the conversion of agricultural land does not reflect the marginal social value of land. It seeks to reflect solely the agricultural potential of land. Higher charge for the conversion of agricultural land is associated with more fertile land. According to categorisation of taxes and charges in [8], the tax or charge may have attributes of an incentive tax aiming at decreasing environmental damage, as well as a revenue-raising tax with the aim to raise revenues for public sector.

The aim of this paper is to assess whether the charge for the conversion of agricultural land has a statistically observable impact on the decision-making of investors in terms of the

location of new development according to its agricultural potential. Thereby we will see if the charge for the conversion of agricultural land is an incentive tax and enhances the protection of agriculturally precious land from development. Our quantitative analysis uses multiple regression models.

The structure of the paper is as follows: In Section 2, the charge for the conversion of agricultural land is defined. Section 3 introduces our multiple regression models. It is followed by the presentation of statistical results in Section 4 and the discussion of these results in Section 5.

1.1 The Charge for the Conversion of Agricultural Land

The charge for the conversion of the agricultural land from the agricultural land fund is defined by Act no. 334/1992 Coll. as amended (this paper works with the version of the act up to date for 2014). The charge is paid for the conversion of land for the purposes of land development, mining and landscaping which needs also soil removal. The charge is not paid for the following conversion purposes: hard surfaces and green areas around housing development (the area of buildings is not excluded from payment), conversion of land for the purposes of public infrastructure and public services provision, conversion of land for agricultural purposes (e.g. for a stable), and wastewater treatment purposes. Gardens belong to the agricultural land fund, therefore the charge does not apply to them either.

The charge is dependent on the production potential of conversed agricultural land. The production potential evaluation (called BPEJ – rated pedological-ecological units) is based on the evaluation of climate types, soil types from the agroecological viewpoint, slope and exposition of land to cardinal directions, the soil structure and depth [13]. Thanks to the data of BPEJ, the Czech Republic belongs to countries with the most detailed information about land types [13]. The charge for the conversion of the agricultural land ranges from EUR $0.1/m^2$ for land with the lowest production potential to about EUR $6.3/m^2$ for land with the highest production potential (2014 prices and the mean of exchange rate for the first quarter of 2014 CZK/EUR 27.44). If land withdrawn from the agricultural land fund is situated within an area of a higher standard of environmental protection (e.g. in a national park), the standard rate of the charge is multiplied by a corresponding coefficient. And the other way round, the standard rate of the charge is divided by a certain coefficient, if the conversed land is affected by contamination, is eroded, is situated within established settlements, or in economically poorer regions. If agricultural land is conversed temporarily only, the charge applies as well and is paid annually as one hundredth of the prescribed total charge.

A part of the charge, 10 % of the charge yield, belongs to the municipality where the development takes place, 75 % to the state budget, 15 % to the State Environment Fund (until 2010, 40 % of the charge yield was revenue of municipalities). Municipalities have to use these revenues for environmental protection purposes.

The most fertile land, which is by Act no. 334/1992 Coll defined as "protection class 1" is further protected from development by a recommendation for public officers to enable their development in extraordinary circumstances only, mainly for public infrastructure projects of high significance.

2 Material and Methods

2.1 Statistical Model: Multiple Linear Regression

In this section, we test more deeply the relation between the land take by new development and land fertility, as well as other predictors of land development in the Czech Republic. We use quantitative analysis, namely multiple linear regression. The data are

statistically analysed using the R language [18]. We use public data gathered by different public institutions (see below details for our variables). The association between land take by new development and land fertility is tested on the statistical sample of individual districts of the Czech Republic (LAU 1). We work with the sums or averages of variables for the district level. The Czech Republic comprises of 77 districts. We used data for 76 of these districts due to the missing value of land production potential in the district Prague, which was omitted in our analysis. The data analysed cover the time period for the years 2008-2012. This time period allows the mitigation of the short-term effects in land development. In this period, neither fundamental changes in district definitions took place, nor was methodology for data collection modified.

We used the following variables in our model:

- Land take by new development excluding public infrastructure (LT_build). It is defined as the change in the total area soil sealed by buildings and yards belonging to buildings (marginally also hydraulic structures and ruins of houses) in the time period 2008-2012. Thanks to the strict forest protection for the purposes of housing development, it approximates the area for which the charges for the conversion of land from agricultural land fund are paid (the exact area levied by this charge is not statistically registered, therefore not applicable). Data source is ([4], [5]).
- Land take by other purposes (LT_other). It is defined as the change in the total area of land take by other purposes in the time period 2008-2012. Other purposes are negatively defined and exclude all agricultural land (gardens belong to agricultural land), forest land, water areas, soil sealed areas by buildings and yards belonging to buildings (marginally also hydraulic structures and ruins of houses). Mainly, this category consists of transport infrastructure, mines, hard surfaces and green areas around housing development (excluding gardens), landfills and the like. Data source is ([4], [5]).
- Change in the area of agricultural land (Agr_l_chan). It is defined as the change in the total area of agricultural land in the time period 2008-2012. Data source is ([4], [5]).
- Fertility of land (Fertil). It is defined as the weighted average of the officially defined land prices (*Officially defined land prices are used e.g. for taxation purposes in the Czech Republic*) for each district. These prices are stated according to the production potential of agricultural land defined above. Data refer to the 1.1.1999 [12]. Although the prices increase in time (e.g. due to inflation), relative differences of production potential remain the same.
- Number of inhabitants in each district (Inhab). It is defined as the mean of the values for the ends of the years 2007 and 2012. Data were taken from Czech Statistical Office [3].
- Area of districts (Area). It is defined as the mean of the values for the ends of the years 2007 and 2012. Data were taken from ([4], [5]).
- Land restoration after mining (Restor). It is defined as the total area of land restored during the period from the end of the year 2007 to the end of the year 2012 after mining. Values of the total area restored after mining for districts are available only for the year 2012 and as the cumulative value of restored area from the beginning of mining [7]. Values of the total area restored after mining for the end of the year 2007 are available for regional level (NUTS 3) and were taken from [6]. To carry out the best approximation of the total area of land restored in districts for the period 2008-2012, we divided the regional data of land restoration for the period 2008-2012 among districts according to the share of districts on the total restored area from the beginning of mining. Land restoration is the reversed process of land development. Therefore the more land is restored in a particular area, the lower increase of LT_build and LT_other is expected.

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- Unemployment (Unempl). It is defined as the mean of the average values for all the years covering the time period 2008-2012. Data were taken from [15]. This variable approximates the situation of job opportunities in districts. We assume, a relatively low unemployment in a certain district is associated with higher attractiveness of the district for housing and with more development.

We defined following multiple linear regression models:
- Model A: Agr_l_chan as the dependent variable (DV), independent variables Fertil, Inhab, Unempl, Area, Restor: This model tests, what are the statistically significant predictors of the change in the area of agricultural land. If the charge for the conversion of agricultural land is environmentally effective, it should help to locate new development into less fertile areas.
- Model B: LT_build as the DV, independent variables Fertil, Inhab, Unempl, Area, Restor: The dependent variable is strongly connected to the necessity of the payment of the charge for the conversion of agricultural land for LT_build purposes. Therefore this model tests the association between land fertility, which resembles the charge height per hectare, and the land take for LT_build purposes.
- Model C: LT_other as the DV, independent variables Fertil, Inhab, Unempl, Area, Restor: This model tests the association between fertility of land and the land take by other purposes without the connection with the charge for conversion of agricultural land. This charge does not apply to the conversion for these purposes.

3   Results and Discussion

Table 1 brings summary statistics of variables used in our multiple linear regression models. All the variables are quantitative.

Table 1. Summary statistics

	Total study sample (n=76)							
	Mean	**SD***	**Median**	**Min**	**Max**	**IQR**	**Skew**	**Kurtosis**
LT_build [ha]	16	55	8	-88	309	38	2.3	9.8
LT_other [ha]	140	241	122	-770	826	193	-0.6	3.0
Agr_l_chan [ha]	-319	217	-285	-1,017	141	245	-0.9	1.0
Fertil [EUR/m²]	0.18	0.07	0.16	0.07	0.33	0.12	0.52	-1.01
Inhab [No.]	121,305	58,133	111,976	40,877	373,430	51,093	1.9	5.1
Area [ha]	103,119	38,267	100,774	23,019	194,562	49,836	0.1	-0.3
Restor [ha]	56	184	4	-28	1 067	22	4.5	20.7
Unempl [%]	8.6	2.6	8.2	3.0	15.3	2.9	0.4	-0.2

*SD, standard deviation; IQR, interquartile range
Source: Author

Our dependent variables are characterised by a relatively low level of skew and kurtosis. It allows us to assume the normal distribution of these variables, which is one of the assumptions for linear regression. The statistical significance of variables will be tested on the significance level $\alpha = 0.05$. To be able to uncover the statistical significance of variables as well as the strength of predictors of land use changes, we undertook standardization of regression coefficients. The strongest predictors have the greatest absolute value of standardized coefficient. A positive value indicates a direct proportion between dependent and independent variable; a negative value indicates an inverse proportion.

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The results of multiple regression analyses are summed up in Table 2. We highlighted statistically significant variables identified by regression analyses in bold.

Following findings arise from the multiple regression analysis:

- The area of agricultural land seems to decrease mainly in districts with relatively higher land fertility (Model A). This is an alarming result showing a serious negative impact of development on the agricultural production potential of the Czech Republic.
- The analysis of the predictors of the change in the soil sealed area by buildings and yards (Model B) did not identify fertility among strong predictors. More development, when abstracting from land-take for public infrastructure purposes, is associated with the lower unemployment and more restored area in districts. Unemployment, as our socio-economic variable, is the strongest predictor in this respect. Fertility is not among statistically significant predictors.
- Fertility is positively associated with the land take by other purposes, mainly transport infrastructure (follows the results of Model C). Land take by other purposes is inversely proportional to land restoration – restored land is after reclamation reclassified from "other purposes" category to another land use type according to its new use.

Table 2. Results of standardized multiple regression models

Model A DV: Agr_l_chan	Null hypothesis significance testing				Confidence interval	
	Scaled coeff.	Scaled SE*	t value	Pr(>|t|)	2.50%	97.50%
Intercept	0.00	0.10	0.00	1.000	-0.19	0.19
Fertil	**-0.36**	0.10	-3.44	**0.001**	-0.57	-0.15
Inhab	0.07	0.11	0.62	0.535	-0.14	0.28
Area	**-0.50**	0.11	-4.73	**0.000**	-0.71	-0.29
Unempl	-0.01	0.11	-0.10	0.918	-0.23	0.21
Restor	0.11	0.11	1.00	0.323	-0.11	0.33

Multiple R-squared: 0.34

Model B DV: LT_build	Null hypothesis significance testing				Confidence interval	
	Scaled coeff.	Scaled SE*	t value	Pr(>|t|)	2.50%	97.50%
Intercept	0.00	0.11	0.00	1.000	-0.22	0.22
Fertil	0.07	0.12	0.63	0.531	-0.16	0.31
Inhab	0.11	0.12	0.94	0.350	-0.12	0.35
Area	0.29	0.12	2.46	0.016	0.05	0.53
Unempl	**-0.34**	0.12	-2.78	**0.007**	-0.59	-0.10
Restor	**0.25**	0.13	2.00	**0.049**	0.00	0.50

Multiple R-squared: 0.17

Model C DV: LT_other	Null hypothesis significance testing				Confidence interval	
	Scaled coeff.	Scaled SE*	t value	Pr(>|t|)	2.50%	97.50%
Intercept	0.00	0.10	0.00	1.000	-0.19	0.19
Fertil	**0.41**	0.11	3.91	**0.000**	0.20	0.62
Inhab	-0.06	0.11	-0.57	0.569	-0.27	0.15
Area	0.13	0.11	1.20	0.234	-0.08	0.34
Unempl	-0.03	0.11	-0.31	0.759	-0.25	0.19
Restor	**-0.35**	0.11	-3.09	**0.003**	-0.57	-0.12

Multiple R-squared: 0.33

*SE, standard error
Source: Author

As follows from Model B, we did not find any statistical evidence that the charge for the conversion of agricultural land has an incentive effect to protect agriculturally precious land from development. Evidence would be a statistically significant shift of land development into areas of lower fertility (agricultural potential) where investors face a lower charge for the conversion of agricultural land.

On the other hand, Model C shows, that land take for other purposes occurs more often in districts of more fertile land. This result might be connected with the necessity to locate new transport infrastructure of regional or national significance into flat areas of lowlands which are associated with the highest level of agricultural quality.

Some limitations of our statistical model should be stressed. We used aggregated data for district level LAU 1 in our analysis, and therefore some potentially interesting findings observable only on the municipal level were left hidden. Do investors in land development systematically pick less fertile land for development if they have a choice within one district? This analysis does not answer locally specific questions. It gives an insight about the decision-making on the district scale.

4   Conclusion

To protect precious agricultural land from development, the Czech Republic implemented a charge for the conversion of agricultural land in 1990ies. The height of the charge reflects the fertility of land which is supposed to be conversed from agricultural production to new development of public infrastructure. It ranges from EUR 0.1/m^2 to about EUR 6.3/m^2 of land conversed.

The aim of the paper is to assess if the charge for the conversion of agricultural land has a statistically observable impact on the decision-making of investors in terms of the location of new development according to its agricultural potential. We might presume that an incentive tax would partly shift new development to areas of relatively lower fertility. Our multiple regression Model A uncovers an opposite trend however – the loss of agricultural land is associated mainly with districts of high land fertility. Model B and C show that the loss of precious agricultural land is associated mainly with new development for "other purposes", specifically transport infrastructure. There is no association between the change in the amount of the area used for development of buildings and yards and land fertility. The incentive of the charge for the conversion of agricultural land to decrease environmental damage by development stays therefore questionable.

The next step in the analysis of the environmental impact of the charge for the conversion of agricultural land is to use local data of selected municipalities about the type of agricultural

land lost for development of buildings and yards. This would help to avoid the simplification present by using averaged district data and verify the results of this analysis on the local scale.

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Development of Number of Physicians and Beds in Basic Medical Branches of Acute Bed Care in the Czech Republic

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Abstract

The paper compares the state of the technical efficiency of acute bed care in basic medical branches – the internal medicine, surgery, gynaecology and paediatrics for 2003 and 2013 by individual regions of the Czech Republic. The development of the technical efficiency is tested by means of the input-oriented Free Disposal Hull model (FDH). Three models were tested (M(2003), M(2013), M(hypothetical)) and they are based on the same input and output variables. There were chosen two input variables, namely the number of beds and number of physicians. The output variable was the number of hospitalized patients in basic medical branches in the regions of the Czech Republic. The results of the testing indicate that the technical efficiency in the basic medical branches improved in 2013 compared with 2003 only in the branch of surgery at the Pilsen Region, in the branch of gynaecology in the Hradec Králové Region and the Central Bohemia Region improved in surgery, gynaecology and paediatrics. The dependence of the individual variables was tested with correlation coefficient. The results of the correlation and technical efficiency confirm the existence of the mutual relationship, i. e. if the linear relationship between selected variables grows, the rate of efficiency of the production units with grows too.

Keywords: acute bed care; basic medical branches; free disposal hull model; correlation coefficient

JEL Classification: C44, C61, I10, I18

1   Introduction

The number and structure of the acute bed care in the Czech Republic have been significant areas of the transformation process interest in the health sector for a long time and reflect economic and social changes. Each change of the transformation principle is characterised by its topic and purpose which intends to pursue. The crucial transformation change of the institutional principle in health care was made on 1 January 2003, when Stage II of the public administration reform was completed. From that day forth, transfer of property from the Czech Republic to the regions and municipalities was achieved and it was based on special acts. This was applied to property (including health care facilities) managed by the organisational components of state and allowance organisations on the date of 31 December 2002 and property the guarantors of which were the district authorities as of 31 December 2012. Since 1 January 2003, the legal form of the acute bed care providers changed significantly in the Czech Republic in favour of the non-governmental sector. Nevertheless, this condition was further developing in the subsequent years, causing the gradual transformation of the regional and municipal allowance organisations, in particular to business-type organisations. This issue also monitors Pirožek et al. [20].

The transformation of the public health care initiated after 2003 were also focused on the restructuring of the bed fund, especially in the area of the acute bed care and still, it is an urgent issue of the strategic importance [17, 25]. In addition to other parameters, Memorandum 2012 also defines the target value of the minimum bed fund utilisation at 75% and requires optimisation of the average length of hospitalization as well as geographic and time accessibility of health care. The governmental strategy for *2012–2020 also explicitly* specifies the necessity to rationalise and restructure the bed care in order to reduce fixed costs and create the long-term

care concept. This means restructuring the acute bed care offer, where there is a significant potential for the reallocation of funds, support of after-care and long-term care using the savings from the acute care, and utilisation of the outpatient network in order to increase the efficiency of the whole system.

In Turkey in 2003 Health Transformation Programme began this partial impact influenced decreasing the number of acute bed care. Authors 18] evaluate within the interval of 10 years the important of financing, efficiency equity and quality of the bed care in individual regions in Turkey. The reduction of beds was also realized in terms of Denmark on the regional level in 2012, where especially the acute care was centralized [6]. The centralization of the bed care was implemented because of increasing the health care speciality, decreasing of length of stay hospitalized patients´ and the quality of the health care. However the reduction of number of bed can be the consequence of the reorganization of the hospital, when the specialized organisational units are formed - Focused Wings [3]. The change of the organisational scheme also stem from the implementation – evidence-based design leads to improving the efficiency and quality of the care, which among others generate the optimization of the bed fund [27].

Also at the level of providers and regional guarantors of health care (municipalities, regions) optimization options that would lead to better utilization of the bed fund and to increase the efficiency and quality of acute care are searched for. These opportunities include, for instance as mentioned [4, 12]the intensification of activities of hospitals, which is based on the centralisation and consolidation of complementary, operating and clinical locations, and the model of the common nursing bed fund. The common nursing bed fund is also envisaged by the Decree of the Ministry of Health of the Czech Republic No. 99/2012 Coll., on the requirements for minimum staffing in health care services. The issue of the common treatment fund is solved in more details by [23]. Model of the common nursing bed fund is, according to the above-mentioned authors, for hospitals of regional importance.

Goal of the paper monitors the development of the technical efficiency of acute bed care fund of the basic medical branches - the internal medicine, surgery, gynaecology and paediatrics in terms of regions during the period 2003-2013.

Efficiency parameters are the number of beds, number of physicians on the input side. On the output side, it is the number of hospitalized patients, all in the basic medical branches according to the individual regions in the Czech Republic. The input-oriented Free Disposal Hull model is used for modeling the efficiency. FDH model is a discrete model of production function, which is based on the same principles as the more familiar models Data Envelopment Analysis (DEA). Options of using the FDH and DEA models to measure health care expenditure assessment are described by [7]. Methods of multi-criteria decision on examples of selected production variables of hospitals are tested by [11]. A comparative look at options of FDH and DEA models within measurement and evaluation of efficiency of inpatient care in the Czech Republic is published by [26]. Authors, who used these models to express the technical efficiency in specific medical branches eg. in terms of psychiatric care [16] or [8] in terms of special ophthalmology hospitals, offer inspirational insights as well. Jacobs [10] also uses two methods of multi-criteria decision-making, namely Data Envelopment Analysis and Stochastic Frontier Cost Analysis and compares the results of the effectiveness of these methods. Ozcan [19] on a sample of selected medical facilities defines results for the selected input and output variables. Kirigia - Asbu [13] dealt with the issue of technical and scale efficiency of public community hospitals in Eritrea. The specific objectives of thy study were: (1) to estimate the relative technical and scale efficiency of public secondary community hospitals in Eritrea in 2007; (2) to estimate the magnitudes of output increases and/or input reductions that would have been required to make relativem inefficient hospitals more efficient; and (3) to estimate using Tobit regression analysis the impact of institutional and entviromental variables on hospital inefficiencies. Foreign authors also deal with the international comparison issue i.e. [9,

24]. For example, Asandului - Roman - Fatulescu [2] evaluation of public healthcare systems in Europe by applying a nonparametric methods such is DEA model.

2 Material and Methods

2.1 Input-oriented FDH Model

Model Free Disposal Hull (hereinafter FDH) belongs to discrete models of production function. Basic property of FDH model is inconvexity of production possibilities set. Decision Making Unit (DMU – the regions) can be assessed unlike DEA models only relatively towards other existing units, not towards their convex combinations. FDH advantage is seen in the fact that character of revenues from scale is not limited by any preconditions. FDH models analyze the input- and output-oriented assignments. In the context of this paper input-oriented FDH model is applied.

Jablonsky - Dlouhý [11] states that input- and output-oriented FDH models are tasks of mixed binary programming. Matrix of inputs and outputs X and Y represent structural coefficients of a task, model variables are vectors λ, $s+$, $s-$ and variable θ (at model based on inputs) and Φ (at model based on outputs). To evaluate the efficiency of all the units must be resolved task for each unit separately, ie. n-times. The value of the objective function measures the distance of the unit from production possibilities. The mathematical formulation input-oriented FDH model is presented in formula (1). Depending on the type of model orientation (input / output) indicates how much it is necessary to increase outputs or decrease inputs so that the production unit is evaluated as effective.

The general mathematical formulation for an input-oriented FDH model is:

$$\text{minimize} \qquad \Phi - \varepsilon(e^T s^+ + e^T s^-) \qquad\qquad (1)$$

$$\text{subject to} \qquad Y\lambda - s^+ = \Phi\, y_q,$$

$$X\lambda + s^- = x_q,$$

$$e^T\lambda = 1,\ \lambda - binary,$$

$$s^+ \geq 0,\ s^- \geq 0.$$

where Y is a matrix of r outputs, X is a matrix of m inputs, λ is the vector of variables, s^+, s^- are vectors of slack variables, $e^T = (1,1,......,1)$, ε is infinitesimal constant.

FDH model tests whether the production unit is non-dominated one or Pareto efficient. It is valid that Pareto makes units effective, when $\Phi = 1$. Provided the variable is $\Phi < 1$, so this result is interpreted that the production unit should increase proportionally the input values by at least over 1 (e.g. $\Phi = 0.8$ and output parameters must be increased by at least 20%).

Evaluation of efficiency according to the input-oriented model FDH verifies two questions. The first question is based on the comparison of results of testing the actual values of selected input and output variables valid for 2003 and 2013 in the basic medical branches – the internal medicine, surgery, gynaecology and paediatrics. *Did technical efficiency in the respective branches of medicine improve in 2013 compared to 2003?*

The second question is based on a hypothetical state of the values of selected variables, where the input variables are at the real level of 2003 and the output variable at the real level of 2013. *What level of technical efficiency can be achieved at inputs of 2003 and outputs of 2013?*

The above questions are tested using three models - M (2003), M (2013) and M (hypothetical), which are designed for individual basic medical branches. All models work with the same types of input and output variables, see Table 1.

Table 1. The variables selected test models

	Inputs		Output
	x1	x2	y1
Model (2003)	Number of beds in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2003	Number of physicians in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2003	Number of hospitalized patients in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2003
Model (2013)	Number of beds in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2013	Number of physicians in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2013	Number of hospitalized patients in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2013
Model (hypothetical)	Number of beds in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2003	Number of physicians in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2003	Number of hospitalized patients in basic medical branches recalculated to 10 thousand inhabitants of region, in year 2013

Source: Authors based on [21, 22]

The number of input and output variables was elected with respect to both the objective of the work and the limited number of DMU – 14 higher territorial self-governing units. In this sense Klieštik [13] states that with the growth of input-output space more conditions on the data packaging definition are needed and therefore recommends that the total number of variables does not exceed 1/3 of amount of the examined homogeneous units.

Selected input and output parameters are standard, with regard to already published findings of similar analyzes, see [15, 26].

2.2 The Status and Trend of Input and Output Variables

Generally, the acute inpatient care is defined in the Act No. 372/2011 Coll., on health services and conditions of their provision, as amended, as health care which can not be provided on an outpatient basis and to be provided, hospitalization of the patient is necessary. The law draws a distinction, in terms of patient's condition, of intensive and standard acute inpatient care. Providers of this form of health care are acute care hospitals, ie. health facilities providing patients in the majority not only with inpatient care but also outpatient care, namely in specialized and highly specialized medical branches. Follow-up or nursing care can be part of this form of care. Acute inpatient care in this article is monitored from the point of view of the basic medical branches - the internal medicine, surgery, gynaecology and paediatrics. The importance of basic medical branches in terms of number of beds reflects their proportion of the total number of acute care beds in the Czech Republic, in 2003 in the amount of 58% and in 2013 in the amount of 49%. The lowest share in this sense belongs to the Capital City of Prague amounting to 40.8% in 2003 and 33.5% in 2013. The highest share in 2003 belonged to Karlovy Vary Region in the amount of 63.8% and in 2013 it was Zlin Region amounting to 58.9% (own calculations according to data from [21, 22]). Within the evaluation of technical efficiency according to the input-oriented FDH model input parameters (x1 and x2) and output parameter (y1) are tested. Based on the results of FDH model testing one can assume (as mentioned above) that the effective unit (in this case a region) with respect to the amount of the output (the number of hospitalised patients) effectively utilizes its inputs (the number of beds and the number of physicians), however, inefficient unit should reduce the input variables.

In 2013 compared to 2003:

- the average number of beds per 10 thousand of region's population decreased in all regions and branches of medicine, namely at internal medicine by 25%, at surgery by 29%, at gynaecology by 27% and at paediatrics by 22%;
- the average number of physicians per 10 thousand of region's population increased in most regions and medical branches - the largest increase in the number of physicians has occurred in the branches of pediatrics by 28%, gynaecology by 12% and internal medicine by 7%. In contrast, in the branch of surgery, the number decreased by 1%;
- the average number of hospitalised patients in 2013 compared to 2003 decreased in the branch of internal medicine by 10%, in the branch of surgery by 16%, gynaecology by 7% while in the paediatrics increased by 5%.

From the ten-year development (2003 - 2013) it is evident that the transformation of the health care subsystem in the form of acute inpatient care in the Czech Republic is affected by the aging population and lower birth rates. Acute care beds are reduced in favor of follow-up care beds (nursing care, hospice, rehabilitation), beds in social welfare institutions, health-social beds etc.

As shown by other evidence [26], in conditions of acute inpatient care the average treatment times and length of stay in hospitals is reduced. Also partial changes at the level of the acute inpatient care providers (hospitals) are apparent, namely in the sense of interconnecting of individual disciplines of care and home care, namely on the basis of needs of an individual territory (region). There is permanent pressure to innovate diagnostic and therapeutic technologies that leads to differentiation of highly specialized care and the development of inpatient care alternatives (establishment of clinical-diagnostic centers, day care etc.), examples of which are university hospitals. In this context the question arises, *"What is the linear dependence between selected variables in monitored years, and what does this dependence say?"*

The correlation (Pearson) coefficient (3) can have the values within the interval $r = \langle -1; 1 \rangle$, where the sign of the correlation coefficient value determines the direction of dependence, i.e. the interval representation of closeness and intensity of the linear dependence of three variants of pairs of numerical variables *x1, x2* and *y* in years 2003 and 2013. In this case, there are eight variations of *x, y* variables for 2003 and 2013. In case of direct dependence, *r > 0*, while *r < 0* in case of indirect dependence. If *r = 0*, the *x* and *y* variables are independent, i.e. uncorrelated. The resulting values of the correlation coefficient *r* shows only the direct dependency.

$$r = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 \sum_{i=1}^{n} (y_i - \bar{y})^2}} \qquad (2)$$

The results of calculation of the correlation coefficient *r* (see Table 2), i.e. interval expression of tightness and intensity of linear dependence of two numerical variables *x* and *y*.

Table 2. The value of the correlation coefficient r in basic medical branches in years 2003 and 2013.

	2003			2013		
	r (x1, x2)	r (x1, y1)	r (x2, y1)	r (x1, x2)	r (x1, y1)	r (x2, y1)
Internal medicine	0.86	0.85	0.85	0.75	0.6	0.42
Surgery	0.66	0.78	0.58	0.63	0.76	0.42
Gynaecology	0.81	0.77	0.78	0.52	0.74	0.41
Paediatrics	0.56	0.83	0.41	0.85	0.84	0.66
Mean	0.72	0.81	0.65	0.69	0.74	0.48

Source: Authors

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Numbers of occurrence of respective degrees (tightness) of dependence, adjusted according to the results in Table 2:

- Absolute dependence $r = <1>$; frequency 0;
- very significant dependence $r = <0.85,0.99>$ frequency 4;
- significant dependence $r = <0.70,0.84>$ frequency 9;
- moderately significant dependence $r = <0.50,0.69>$ frequency 7;
- insignificant dependence $r = <0.35,0.49>$ frequency 4.

Frequencies in different degrees of dependence and the average figures r (see Table 2) confirm that there was higher dependence between variables in 2003 than in 2013. *"How can the above-mentioned different dependence rate be explained?"* Both in 2003 and in 2013 the dependence is most evident between $x1$ (number of beds) and $x2$ (number of physicians). In 2003 also between x1 (number of beds) and y1 (number of hospitalized patients). It is obvious that the number of hospitalized patients is limited by the number of beds in a ward, which implies we can not hospitalize more patients than the maximum capacity of beds is. The number of beds is continuously reduced, depending on the demand for acute inpatient care. Generally, the number of hospitalized patients in acute inpatient care is on decline.

Conversely, low dependence is generally in accordance with Table 2 between x2 (number of physicians) and y1 (number of hospitalized patients). In this case, it can be argued that the number of physicians is not directly tied to the number of hospitalized patients, but not to the number of beds either. Numbers of physicians grow (especially in 2013) compared to the number of beds and the number of hospitalized patients which are rather on decline.

3 Results and Discussion

Summary results of efficiency for all the models are shown in Table 3. The most effective combination of input variables (number of beds and number of physicians) in relation to the amount of output ones (number of hospitalized patients) have been reached by regions withinin all the medical branches in the model $M_{(2003)}$. This corresponds to the largest number of efficient units and the average values of index Φ. In 2013, the efficiency worsened compared to 2003, as shown by the average values of efficiency and the number of efficient units (see Table 3). The results of the hypothetical model $M_{(hypothetical)}$ indicate a lower level of efficiency compared to $M_{(2003)}$ and $M_{(2013)}$. This means that if within the years 2003 - 2013 the number of beds would not have been reduced then the real technical efficiency of selected parameters would be at the level of the model $M_{(hypothetical)}$. However we can say that "the efficiency of regions within the selected variables in the basic medical branches in 2013 compared to 2003 worsened." The causes can be attributed to the insufficient reduction in beds, increasing numbers of physicians and reduced number of outputs - hospitalized patients. The above-mentioned is also confirmed by the small differences between the average results of effectiveness of the models $M_{(2013)}$ and $M_{(hypothetical)}$.

Table 3. The results of efficiency accroding to the individual models and medical branches.

		Internal medicine	Surgery	Gynaecology	Paediatric
	$\Phi = 1$	11	8	8	10
M (2003)	$\Phi < 1$	3	6	6	4
	mean Φ	0.986	0.962	0.974	0.982
	$\Phi = 1$	5	7	8	9
M (2013)	$\Phi < 1$	9	7	6	5
	mean Φ	0.927	0.927	0.952	0.945
	$\Phi = 1$	4	6	5	8
M (hypothetical)	$\Phi < 1$	10	8	9	6
	mean Φ	0.878	0.918	0.961	0.960

Source: Authors

Efficiency improved in medical branches in 2013 compared to 2003 only in five partial cases: surgery - Pilsen, gynaecology - Hradec Kralove region, surgery, gynaecology and paediatrics - Central Bohemian region.

The above-stated results of correlation and efficiency testing based on the FDH model confirm the existence of an interrelation in a sense - when the linear dependence between selected variables grows (between inputs mutually and between inputs and outputs), the rate of efficiency of the production units grows as well.

In light of these results it can be stated that in conditions of acute inpatient care and especially these basic medical branches there was still room for reduction of bed fund after 2013. The question of demand for acute inpatient care depending on the number of hospitalized patients in terms of health care is a highly specific issue. The increasing rate (at both national and regional level) of hospitalized patients can point to deteriorating health of the population or artificial increase of hospitalization on the part of providers. In contrast, the declining trend in hospitalized patients does not necessarily mean that the health of the population improves. That is why it si not appropriate in order to improve economic respectively technical performance of the acute inpatient care providers to recommend increase in hospitalized patients. The number of hospitalized patients must follow a legitimate demand on the part of potential patients. It is also obvious that the demand for legitimate acute inpatient care is influenced by many factors which, inter alia, the development of treatment procedures belongs to. Reduction of the number of beds has also its limits related to both the staffing of acute inpatient care and the rational use of immovable property and including technical facilities of providers while maintaining acute inpatient care locally. Solutions can be searched eg. in intensification of activities in hospitals or in common nursing bed fund in order to maintain the best possible quality and availability of acute care.

The examples from abroad show that the organisational ganges in terms of the particular hospital, which are the consequence of the accepted development of the society and the change of the structure of the demand for the hospital care lead mostly to the natural decrease of the capacities [3, 27, 6].

4   Conclusion

Technical efficiency reflects the effectiveness of output and input variables of the given production process of a unit. Production process in the context of this article means acute inpatient care implemented in the basic medical branches - internal medicine, surgery, gynecology and pediatrics. FDH model can be considered as an assessment tool of "internal" efficiency of a production unit because unlike the DEA model it does not compare production units between each other. The advantage of this model is the fact that it is not limited by any yield of scale character assumptions. Within the contribution the input-oriented FDH model was chosen.

Comparison of results of testing of selected input and output variables for 2003 and 2013 shows that the technical efficiency of individual production units in basic medical branches in 2013 compared to 2003 deteriorated. Improving of efficiency was evaluated only in five cases for individual medical branches, namely at surgery in the Pilsen and Central Bohemia Region, at gynaecology for Hradec Kralove Region and the Central Bohemian Region and only the Central Bohemia Region showed an improvement of efficiency rate at paediatrics.

Dependence among selected variables was tested by correlation coefficient. The results confirm higher dependence among selected variables (beds, number of physicians and number of hospitalized patients) in 2003 than in 2013. In 2013, the most noticeable dependence is only between the number of beds and the number of physicians. Decree No. 99/2012 Coll., on requirements for minimum staffing of health services, addresses staffing of a hospital facility in relation to the number of beds that is contracted between the medical facility and a health

insurer. The Ministry of Health of the Czech Republic in cooperation with health insurance companies are constantly discussing the number of beds in acute care hospitals but the more fundamental changes in the bed fund is still pending. Changes to bed funds occur more gradually, based on particular demographic effects and effects in therapeutic procedures and methods. Low dependence rate is established between the number of beds and the number of hospitalized patients. It is obvious that it is not necessary – with the development of medicine - to perform certain procedures followed by hospitalization of the patient but the patient is released to home treatment without necessity of hospitalization. The number of physicians is not directly tied to the numbers of hospitalized patients.

Results of the testing efficiency through FDH model have shown that provided the linear dependence between the selected variables grows the rate of efficiency of production units grows too.

Acknowledgements

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Blank Spots in Social Business Activities.
Case Study at the Local Level

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Abstract

Social entrepreneurship is characterised by a high degree of creativity and innovation, not only in technical terms but also in relation to management-social aspects. Social entrepreneurship is a relatively young sector which is not legally addressed in the Czech Republic. Its development dates back to the 19th century but its main development comes in the second half of the 20th century. The objective of this paper is to assess the current issues faced by social businesses – at the local level- in the city of Brno. The main research question is to identify blank spots in social entrepreneurship. To assess the specific problems of the social entrepreneurship, the method of qualitative survey in selected social businesses has been selected. At the same time, we have carried out an analysis of the cooperation between public administration and social businesses in selected cities. The blank spots described by social businesses included the legal void in defining the social business, misunderstanding of the term by the public, problems with public tenders. On the contrary, the positive feature was the current EU grant policy. It is obvious that in the CR there is a missing government conception of social entrepreneurship and legislative definition of the social business which would direct the formation and development of social businesses in a long–term horizon.

Keywords: social economy; social entrepreneurship; grant policy; public administration; disadvantaged people

JEL Classification: L31, M14

1   Introduction

The term social economy started appearing in the 1930s; however, the term social enterprise is much younger. In the past, the terms social entrepreneurship and social enterprise were almost unknown. [7]

Social economy is believed to come from France. French economist Charles Dunoyer first published the term social economy in his publication titled Nouveau traité d'économie sociale where he advocated the moral conception of economy [14]. One of the social entrepreneurship pioneer was Billa Drayton, the founder of Ashoka (1980s). Ashoka is the largest network of social entrepreneurs, with about 3,000 members from 70 countries [1].

The social economy and social entrepreneurship principles are based on triple benefits called "triple bottom line". A business following this triple bottom line or triple accountability presents to the citizens that it does not only focus on the economic side of business but also the environment and social capital. [13]

Social entrepreneurship is also characterised by a high degree of creativity and innovation, not only in the technical sense, but also in the managerial and social perspectives. Social entrepreneurship is a relatively young sector which is not legally addressed. It is mainly viewed from the point of view of the NGO sector [7]. In the not-for-profit sector, the social business could have a form of a public benefit company or civic association [11]. However, this was only true until the end of 2013. Since 2014, these legal forms have disappeared and have been transformed into cooperatives, institutions and associations [21]. Furthermore, according to Malík Holasová, the legal forms of social businesses in the Czech Republic are cooperatives and limited liability companies.

The key objective of social economy is to bring disadvantaged people to the labour market and thus reduce the dependence of people on public support in unemployment. The state encourages social entrepreneurship at the start of its activities, strives after facilitating the conditions for the formation and development of such an enterprise. Social enterprise is understood as a business employing people from target groups (the target groups are listed in chapter 1.1): „*It is built upon the partnership of the public and private sectors in providing public services and encouraging public employment policy*" [10]. Thus, social business is quite unique as both these sectors closely cooperate and it may be understood as social policy executors. This is the main reason why the social enterprises receives abundant funds from the CR as well as EU budgets. Despite this funding, the social business remains independent and its decision-making on its business operation must not be influenced by anyone from the outside.

1.1 Social Business

In her book titled Social Entrepreneurship and Social Business (2012), Christine K. Volkmann states that a uniform definition of social entrepreneurship has not been formed to date. Various definitions vary from very narrow to very broad understanding. Social entrepreneurship is described here as an opportunity for social changes rather than profit orientation in the traditional sense of the word. Social entrepreneurship is related to increasing the amounts of funds used to address social issues. [17]

In the Czech social environment we can find various definitions for the social business. According to Hunčová (2007), a social business usually provides specific services of general interest, including employment services and employment, and risk protection both for the members as well as local communities rather than amassing profits. Thus, social entrepreneurship is an activity performed not only to generate profits and at the same time it is not just about providing care to those in need [11]. According to Malík Holasová, continuous economic activity must also be performed.

In order to consider a business as social, it must meet 4 criteria:

- a minimum of 40 % of the employees must come from the target groups of disabled or otherwise socially excluded people.
- effort to engage the employees to the decision-making process in the maximum possible extent.
- a minimum of 51 % of the profit must be reinvested in further business development.
- orientation to the local community and use of local sources. [5]

The target groups defined for social entrepreneurship are mainly the following: disabled people, people approaching retirement age, migrants, mothers returning from maternity leave, mothers - single parents with small children, long-term unemployed, young people without work experience, people released from prison, homeless people, adolescents from children's homes, people on a low income [17].

In 1980, the National Council for relations between mutual companies, cooperatives and associations issued the Charter of Social Economy. It defines the social economy as „*a group of organisations that do not belong to the public sector, which are democratic and have a special profit allocation system for its further development and improvement of services for its members and the society.*" [7]

One example of a special type of social business is WISE (Work Integration Social Enterprises), primarily aimed at people with disabilities. These enterprises emerged in Europe at the beginning of 1970 and are financed by long-term subsidies [11]. However, not all experts understand WISE as one of the potential variants of social business. It is a business with social responsibility but it need not meet the criteria of a social business.

In his book titled Social Business, economist Muhammad Yunus (2014) presents 7 principles of social business:

- Business objective will be to overcome poverty, or one or more problems which threaten society,
- Financial and economic sustainability.
- Investors get back their investment amount only. No dividend is given beyond investment money.
- When investment amount is paid back, company profit stays with the company for expansion and improvement.
- Environmentally conscious.
- Workforce gets market wage with better working conditions,
- The last but not least important message says: do it with joy! [20]

Social enterprises can come up with innovative solutions in those areas where the market and the government fails or in those areas where their invisible or administrative hands have no reach. The innovativeness of social businesses can be captured by using Schumpeter's theory according to which the entrepreneur inventing and applying new combinations in the production contributes to economic development. These new production combinations are understood by Schumpeter as: changes in the launching a new product or new product quality, introducing new methods of production, opening up of new markets, acquiring new sources of raw material and new industry structure [6]. According to Defourny (2004) all these five combinations may be observed in social economy and social entrepreneurship.

Table 1. Principles of social business

Principles of social business	1. Social benefit	2. Economic benefit	3. Environmental and local benefit
Public beneficial objective formulated in the incorporation documents and via specific activities	a) the conducted activities benefit the society or a specific group of people b) participation of employees and members in the business orientation	a) potential profit is preferentially used to develop the social business a/or top meet public beneficial objectives b) independence of managerial decision-making and management on external founders or incorporators c) ability to manage economic risks d) at least a minimum share of revenues from the sale of products and services in the total revenues e) restricted assets disposal rights (the so-called Asset lock) f) systematic economic activity g) trend towards paid work.	a) preferential addressing of the needs of the local community and local demand b) preferable use of local resources c) respect for environmental aspects of production and consumption d) cooperation between social business and local stakeholders.

Source: [5]

Besides the principles of social business, TESSEA also defines the principles of integration social business. The TESSEA principles include and request that employment and social inclusion of people disadvantaged in the labour market should be formulated and implemented in the incorporation documents and met through specific activities.

1.2 European Dimension of Social Entrepreneurship

International networks dedicated to research and promotion of this concept have its importance and major share in establishing the European social entrepreneurship. It includes the European network EMES, which has defined, on the basis of the research into the social economy and social business in fifteen European countries, an ideal type of social business. The EMES approach has been adopted by other leading international organisations such as CIRIEC [3] and Social Economy Europe[15].

The Linz Appeal gives good reasons for recommending social enterprises. It states that social enterprises are present in the market as a supplement to companies generating profits. Nowadays, high professional demands are set and there is high pressure on higher productivity. This entails problems employing the disadvantaged groups. There is frequent uncertainty related to short-term employment of such people and uncertainty both on the part of the employees and employers [8].

An important specific feature of transitive economies in the field of social business is the fact that the main object was the domestic inhabitants of these countries on the verge of poverty and social exclusion. On the contrary, in advanced countries there has arisen a need to develop social business as a result of socio-economic inclusion of migrants. Therefore, it was necessary to look for our own and individual tools for implementation as addressing problems in transitive economies has a different target group.

1.3 Current Status of Survey in the CR

P3 – People, Planet, Profit o.p.s in cooperation with the ProVida foundation conducted a survey to obtain more information on social enterprises in the CR. The first questionnaire survey was performed in January and February 2013. For the survey, a total of 143 contacts were used, of which the questionnaires were returned by 100 social enterprises. To obtain the contacts, use was made of the MPVS database and website listing applicants in calls to tenders launched by the European social funds.

The available results show that most social enterprises are located in Prague, i.e. 22. Most of the respondents are involved in the restaurant and accommodation business, i.e. 24. Closely after these, i.e. 2 enterprises do business in gardening, vegetation control, property maintenance and cleaning work. The prevailing legal form of the social enterprises is a limited liability company- a total of 45 companies. The second most frequent, 24, are public benefit companies. An interesting indicator was the incentive to form a social enterprise. The most frequent formation was related to socially-related motivation. 9 out of 10 of these enterprises employ people disadvantaged in the labour market. The most commonly employed group are people with disabilities, in up to 72% of these enterprises. The average turnover over the past three years has amounted to 3.6 mil. CZK. The main sources of income generated by these enterprises are income from their own activities, and the second major source is EU funding [4].The second survey was conducted in January 2014. In the second questionnaire survey we managed to collect questionnaires from 115 social enterprises. Most social enterprises are still based in Prague (26%), the target group being people with disabilities. There was an increase in the number of enterprises employing the long-term unemployed jobseekers, from 19% to 28%. The most serious problems include the funding of the activities of the enterprise. Most entrepreneurs prefer additional financing for their activities through grants and contributions. Managers are most interested in consulting services in the field of business funding [5].

Another independent survey was conducted from February to October 2014 by the Faculty of Economics and Administration. We approached by successful applicants in Call no. 30 - Social entrepreneurship - a total of 131 applicants. Of those applicants, we managed to receive questionnaires from 62 social enterprises. The results of the survey were consistent with the results of the survey conducted by P3 - People, Planet, Profit ops: based on the legal status, the

highest number came from limited companies and public limited companies, the most frequently employed group of disadvantaged people were physically handicapped people and the businesses put the greatest emphasis in financing its activities on the possibility of receiving grants. [18]

A total of 8 ambassadors were appointed for the Czech Republic and since 2013 they have been commissioned to promote social entrepreneurship in their assigned regions (Region Northwest, Southeast, Central Moravia, Moravia-Silesia, Northeast, Southwest, Central Bohemia and Prague). The individual ambassadors familiarised regional or municipal authorities, start-up or existing social businesses as well as other companies intended to enter into social business with the concept of social entrepreneurship [4].

2 Material and Methods

Accurate statistics on the number of social enterprises in the Czech Republic cannot be obtained from government sources. This is due to the fact that no such comprehensive study focusing on social enterprises has ever been developed. Such a study would in fact be very difficult especially in terms of classifying who falls under the social enterprise definition and who does not. The Czech Social business website currently registers about 217 social enterprises. [5]

This paper aims to assess selected current problems in the activities of social enterprises in Brno. The main research question is to identify blank spots in social business. To assess specific problems in the activities of social entrepreneurship, we chose the qualitative survey method. Qualitative survey was conducted in existing and thriving social enterprises in Brno. Although this is not a representative sample, further assessment can make use of other surveys conducted in other social business. The main research question focuses on legislative as well as other support for social businesses and identification of potential risks in the business operations.

The second line to detect the blank spots in the environment of social entrepreneurship was to conduct structured interviews with representatives of public administration. These structured interviews were conducted with representatives of social departments in the two designated cities, where selected social enterprises ran their businesses- the Statutory city of Brno and City of Znojmo.

The paper will conclude with the evaluation of the results of qualitative survey in selected social businesses and subsequently in relation to public administration. This qualitative survey was initiated primarily by the financial support from European programmes which are offered within the European Social Fund. These programmes are designed to expand or develop social enterprises, although this type of business is not defined by law. The definition of social enterprise is governed solely by the terms of the calls put out within the European operational programmes.

Structured interviews were conducted at selected social enterprises in January 2015, interviews with selected civil servants took place in February 2015 at the relevant authorities. The data was compiled mainly from the interviews and consultations, and the responses were then analysed and compared based on the actual socio-economic environment.

2.1 Empiric Survey

In total, we approached six social enterprises; four enterprises were approached for cooperation in Brno, two in Znojmo. Of the six businesses, four expressed interest in cooperation, cooperation was terminated with one company after a monthly reminder. All the three businesses they were surveyed had their target workplace in Brno. In addition to the

structured interviews, we also analysed internal documents of the social businesses and websites and we visited their production premises.

Social enterprises involved in the survey: Coworking Services, s.r.o. , SIMEVA, s.r.o., HLÍVENKA, s.r.o. The structured interviews took place directly with the management of the businesses. These businesses deal in document management, service offer (cleaning, building mauntenance) and oyster mushroom growing. They employ prevailingly disabled people.

The main directions in qualitative surrey were primarily the following areas: Which target groups are employed in the social enterprise, opinion on legislation in the field of social entrepreneurship, advantages and disadvantages of social entrepreneurship, is it a marketing advantage that a social enterprise employs specific groups of employees, it is possible to consider the social entrepreneurship as one of the important ways to reduce unemployment?

3 Results and Discussion

The qualitative survey results in the following:

- All these companies employed people with disabilities. The interview showed that more demanding work is with the target group of people of schizophrenia (SIMEVA s.r.o.).
- All businesses show significant effort to have the term social enterprise laid down in law, all respondents complained about a lack of understanding of the concept by the public – their potential clients.
- There are significant problems with tendering procedures where companies equally argued that the employed specific groups discourage contracting authorities in such tendering procedures.
- In terms of marketing, the companies agree on personal contacts, especially personal discussions and communication. Social enterprises do not invest time and resources to other forms of communication. There is a difference between commercially oriented businesses where most companies employ marketing experts.
- The benefit in social business listed by the social enterprises is the grant policy with individual programmes from the European Social Fund. All these companies have used funding from the European grants and, on the other hand, contributions provided by the Employment Office to the employers.
- With respect to the answer to the question of whether it is possible to include social enterprise in active employment policy, the answer provided by the three respondents differed: two companies confirmed the thesis that social entrepreneurship reduces the unemployment rate, while the third company was clearly against this statement. Subsequently, they agreed that the public administration does not support social entrepreneurship (excluding subsidies and allowances provided to the employees by the Labour Office).

Social enterprises that have taken part in the survey indicate that the city of Brno does not support social entrepreneurship. The answer from the Department of Social Welfare was: "*There has been no political will to date to promote social entrepreneurship. However, this need has been incorporated into the Community Plan of Social Needs. The City of Brno submitted two projects, neither of them was supported*". *The City of Brno shows an obvious effort to support social entrepreneurship in the future.* The answer from the municipal office in Znojmo, "*In Znojmo there is only a small number of social enterprises*". The town of Znojmo does not currently address this issue.

The follow-up survey, i.e. structured interviews with civil servants which was conducted in the public administration (Brno City Municipality, City of Znojmo) indicates that social businesses cooperate most with employment offices, or towns and municipalities. Cooperation

between employment offices and municipalities or towns is obvious but, on the other hand, there is no coordination in setting the amount of contributions for different groups of applicants and the selection of appropriate tools or targeted programmes. Logically, cooperation here is not possible because the work of employment offices is based on the concept of the MLSA and, methodologically, the employment office is controlled by the General Directorate of the Labour Office of the CR.

From the Brno City Municipality – the Social Welfare Department mentioned the possibility of support to be provided to social entrepreneurs: the rent amount could be more favourably set by the City of Brno along with preferential allocation of space to entrepreneurs whose business plans have social aspects. Furthermore, financial support for social enterprises, i.e. one of the examples might be a fund set up to co-finance projects.

4 Conclusion

The aim of this paper was to assess the blank spots in the environment of selected social enterprises in Brno. The survey was based on qualitative data collection from selected businesses and structured interviews with civil servants. This qualitative survey at the local level and identification of problems in three interviewed social enterprises is certainly not a representative sample; nevertheless, after a basic analysis of the findings these provide a result that can be used for further and more detailed elaboration. Furthermore, this is the result that could be used as a supporting material for the Government Council for Non-Profit Organisations when discussing social entrepreneurship. The results of this survey confirm previous findings that were collected by P3 - People, Planet, Profit o.p.s. or partial survey made by the Faculty of Economics and Administration at MU. The outputs also indicate that towns and municipalities approach the issue of social entrepreneurship differently. An important step that could be taken by the regions, cities and municipalities is to initiate a solution to the legislative aspect of social enterprises. This support should be more proactive towards ministries and the government.

The main stakeholders influencing the operation of social enterprises are the public administration, the European Union and the non-profit sector. The most engaged party is the public administration. There is a problem on the part of the state since the social economy is not defined and there is no classification into a specific sector, either. Currently, social economy and social entrepreneurship fall under the Ministry of Labour and Social Affairs - social benefits are dealt with by the Ministry of Industry and Trade and the economic benefits and local benefits by the Ministry of Regional Development. This is also addressed by the Government Council for NGOs and the Agency for Social Inclusion [2]. In terms of the conception of social business setting, the principal role must be played by the state and public administration in order to legally define the criteria for social enterprise. This all has to respect the socio-economic trends brought about by the development in Europe [19]. Subsequently, the public sector will prepare, within the context of regional and local policies, the environment for social activities - for the establishment, support and development of social entrepreneurship [12].

In February 2014, the Thematic Network for Social Economy TESSEA prepared a proposal for defining social enterprises in the Czech legislation. No single European regulation is feasible since each environment is different. Therefore, there are possible approaches: the social enterprise shall be laid down in the Czech legal system, the "socially beneficial employer" should be defined in the Employment Act as a form of targeted programme, or integration should be promoted, a tool for employment support (within the competence of the MLSA), [5]. The bill concerning Act on Social entrepreneurship is already included in the legislative plan of the government, but the first version has not been addressed to the parliament yet.

For the future development, these conceptions raise further issues relating to the social enterprise to be addressed. It will be necessary to resolve, for example, the question: is a self-employed person a social enterprise? If the founder is a municipality or a private institution, it is

necessary to ensure independence in decision-making and management - how to treat this? We must not omit that social entrepreneurship must have set quality criteria as is the case of social services [9]. This is just a small list of questions that must be answered and discussed. It is also a subject of further surveys in the area of setup and operation of social entrepreneurship.

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Patent Activity Analysis of Czech Universities
at the Industrial Property Office of the Czech Republic

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Abstract

Universities contribute to economic growth not only through teaching and research, but through engagement and collaborations with industry and other off campus entities. One way of measuring the economic effects of these activities is to examine patent data. Recent years have seen an increased use of patent metrics to evaluate innovation and research performance. Patent documents and patent data generally have several advantages as technology indicator, whereas they are accessible in electronic formats. These data provide details of inventions resulting from university research and collaboration. Sophisticated analysis enables us to examine these documents and track technological knowledge. This pilot study examined patents originating from 19 Czech universities and considered metrics such as: the number of patents published, or technology specializations, or number of family numbers, or type of intellectual property rights, or the frequency of citations of patents in patent documents, success by patent granting. From this data we were able to extend our basic understanding of the relationship between patents and the impact of university originated research.

Keywords: university patents; patenting activity analysis; leading technology overview; impact of patents; significant patent information

JEL Classification: O3, I28, H4

1   Introduction

Patenting activity has a direct impact on the country's economic growth. Policy-makers have high hopes for public research as a new source of growth. Despite the relatively small amount of (formal) academic patenting activity that takes place, the increased focus on patenting academic inventions and licensing them to companies has raised a number of concerns common to countries throughout the OECD area and beyond. These concerns range from the impact of patenting on the traditional missions of universities, the effect on the direction of research, on the actual costs and benefits of patenting and licensing, to the effects on the diffusion of and access to publicly funded research results [2]. This study can be used as the source of significant information about scientific and technological breakthroughs that could become major innovations aimed at enhancing the transfer and exploitation of public research results. University patents are defined as patents where at least one applicant is a university. The results revealed that all 19 universities showed patenting activity supported with public funds. Patent documents filed by any of these university entities and published over the study period from 1 January 1990 till 30 June 2015 are included in this study. The study identified 4,398 university inventions or technical solutions published at database of the Industrial Property Office of Czech Republic. Patent activity is frequently used as a proxy for technological innovation, that is, the method by which new or enhanced technologies are made available and brought into widespread use [8]. The primary purpose of this study was to use patent metrics to assess university research, including methodologies and results against the metrics. A secondary purpose was to explore the linkages across existing data sets from the innovation and research portfolio [6].

2   Material and Methods

Evaluation is one of the important strategic instruments for obtaining feedback and testifying on the functionality of the management system of research and development (R&D). Based on evaluation results, top officials usually make decisions and then allocate and redirect funds to support public research. The plans of science policy, research priority direction proposals, R&D system reform, the reorganization of R&D institutions all proceed from the obtained analytical findings and outcomes under the evaluations [7]. The Methodology of Evaluation of the Results of Research Organizations and Results of Finished Programmes approved by the Czech government is structured into three connected pillars, which will be applied in coordination. Pillar I: Filed evaluation of publication results. Pillar II: Evaluation of the quality of selected results. Pillar III: Evaluation of patents and non-publication results of the applied research. Collectively, the public sector organizations have created a set of legal protection that is larger in number of legal protection cases than the private sectors portfolio [4]. The question therefore arises whether specific detachment of scientifically technological thinking stems from a meagre university involvement in the process of commercialization of inventions developed by them, whether it also has other institutional base? This study evaluates the patent activity of Czech Universities according to pillar III to try get answer, where Czech universities directs its research and how it has the potential for commercialization. Second research question is how much is patent activity of Czech universities influenced by methodology of evaluation of research organizations and evaluation of finished programmes valid for years 2013 – 2015. Any specialized software enables us to examine data sheet of published 4,398 university inventions or technical solutions and 'track' technological knowledge and its possible diffusion in the economy. Only data from Czech patent database and their analysis in spreadsheet software has been carried out. This study demonstrates that such an assessment can be undertaken efficiently by relying on the identification, analysis, interpretation and visual representation of patent datasets. This study adopts quantitative metrics for determining the scope and impact of patents originating from the 19 Czech universities. These metrics are.

- Metric 1 – Type of Intellectual Property Protection. The distribution of national patent applications, European patent application and national utility models.
- Metric 2 – Leading technology overview: the distribution of a university's patent documents across main IPC section in Time
- Metric 3 – Number of published patent documents for each university: the total number of patent documents of all universities published over the study period.
- Metric 4 - Trends in patent activity: the total number of patent documents for all universities published over the study period.
- Metric 5 - Trends in patent activity per university: the number of patent documents for each university per year.
- Metric 6 – Technology specialization: the distribution of a university's patent documents across 32 different technology fields
- Metric 7 – Trends in technology specialization: the number and percentage comparison of main technology fields in 2006 and 2012.

Recent years have seen an increased use of patent metrics to evaluate innovation and research performance. Patent documents are accessible in electronic formats and provide details of inventions resulting from university research and collaboration. From this data we were able to extend our understanding of the relationship between patents and the impact of university originated research [6]. The most of the metrics mentioned above has been used to assess the scope and impact of inventions to evaluate research performance of university patenting in Australia. This study demonstrates that such an assessment can be undertaken

efficiently by relying on the identification, analysis, interpretation and visual representation of patent datasets.

3 Results and Discussion

3.1 Type of Intellectual Property Protection

Not all inventions are patentable. Patents cover inventions which are new, susceptible to industrial application and not obvious to someone with knowledge and experience in the technology area. An invention must meet several criteria if it is to be eligible for patent protection [6]. These include, most significantly, that the invention must consist of patentable subject matter, the invention must be industrially applicable (useful), it must be new (novel), it must exhibit a sufficient "inventive step" (be non-obvious), and the disclosure of the invention in the patent application must meet certain standards [9]. A utility model is a registered right which confers exclusive protection for a technical solution. It resembles a patent in that the technical solution must be new it must possess "novelty" and must display a measure of inventive achievement it must involve an "inventive step", though generally the level of inventiveness required is not as great as it is in the case of patents. The prosecution of patent applications until grant typically takes several years.. Unlike utility models are granted as a rule without a preliminary examination to establish novelty and inventive step and length of formal prosecution is several months. This means that protection can be obtained more rapidly and cheaply, but that the protection conferred is less secure [3]. The most interesting result of this study is fact that the universities are focused especially on utility models (2700 cases) than on patents (1699 cases). According to this result, the universities as government's proprietors are developing the especially technical solution with lesser economic importance or short-term use.

3.2 Leading Technology Overview

The academic research fields that fall under patentable subject matter include engineering, physical and life, sciences and medical research. The following figure shows the total number of patent documents for each university published over the study period. . The study identified 6,133 citations of IPC section (from 4,398 published documents).

Figure 1. Leading technology overview according to IPC section
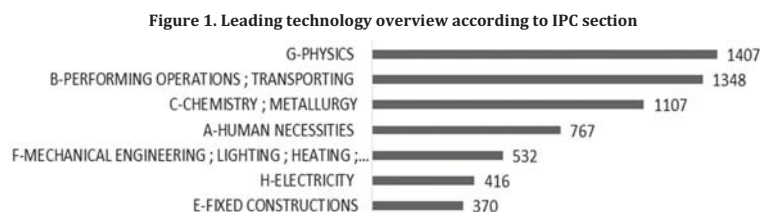
Source: Authors

3.3 Number of Published Patent Documents for Each University

The study identified 4,493 university patent documents published at database of the Industrial Property Office of Czech Republic. It means that 94 patent documents including more than one university as applicant of patent documents. The following figure shows total number of university patent documents over the study period.

443

Figure 2. Number of published patent documents for each university

University	Count
Czech Technical University in Prague (CVUT)	1126
Czech University of Life Sciences Prague (CZU)	472
Brno University of Technology (VUT)	463
University of Chemistry and Technology, Prague (VSCHT)	407
Technical University of Liberec (TUL)	396
VŠB - Technical University of Ostrava	354
Mendel University in Brno (MENDELU)	205
University of West Bohemia in Pilsen (ZCU)	194
Tomas Bata University in Zlín (UTB)	168
Charles University in Prague (UK)	163
Palacký University in Olomouc (UP)	154
The University of South Bohemia in České Budějovice (JCU)	137
Masaryk University in Brno (MU)	106
University of Pardubice (UPa)	52
The Institute of Technology and Business in České Budějovice	42
The University of Hradec Králové (UHK)	17
University of Veterinary and Pharmaceutical Sciences Brno (VFU)	17
The University of J. E. Purkyně in Ústí nad Labem (UJEP)	14
University of Ostrava (UO)	6

Source: Authors

3.4 Trends in Patent Activity

Patents and patent applications are generally published 18 months after the earliest priority date of the application. Utility models are generally published when formal prosecution is disposed of and it usually take only a few months. These issues also need to be taken into consideration by patent data evaluation. From this reason data from years 2015 and 2014 are not included in the following figure, because it can misrepresent outcomes. All 19 universities exhibited increasing patenting activity after year. University patent publications generally peaked in 2012 at 769 cases, followed by a decrease in 2012 in utility model filing, but slightly increase in 2012 in patent applications filing. This fact could be caused by methodology of evaluation of research organizations and evaluation of finished programs valid for years 2012. This methodology has been change in year 2013. University patenting activity over the study period averaged 8,7 new published patent document (patent and utility models) per university per year can be considered, but if we are focused only on patent only, averaged 3,5 new published patent can be seen. But during the most active year 2012 has been filed average 41 case per year per universities (11 patents and 30 utility models). It must mention that patent activity also depends on technology areas, number of applicants and large of entities, so average value is not suitable metric for patent activity evaluation in total numbers.

Figure 3. Trends in total patent document filings, 1990-2013, according to priority date
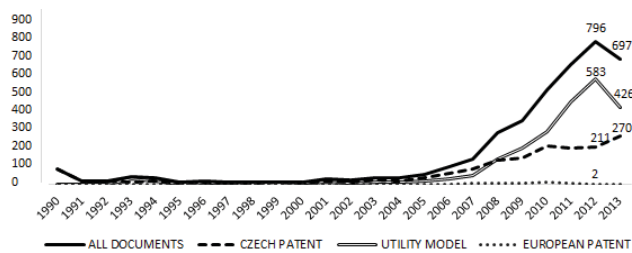
Source: Authors

Trends in Patent Activity Per University

The patent activity metric is an indicator of a university's propensity to seek patent protection for inventions originating from its research, whether the research was conducted by the university itself. In 1990, the total number of patent applications filed by UPV is estimated to be around 88 cases, and invention has been developed only by 6 universities. In following years, there has been a downward trend in filings. The same number as in year 1990 has been achieved first time in 2006, when 98 patent documents has been filed by 14 universities. Between 2004 and 2012, there was a significant increase in the number of filings. In the most active year 2012 has been filed 796 patent documents developed by 18 universities.

Figure 4. The distribution of filed patent documents per year per universities

University	Total nr	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990
		97	353	697	796	665	522	352	288	142	98	54	35	38	27	33	15	16	13	14	17	14	36	43	21	19	88
CVUT	1126	25	65	185	136	136	116	82	81	43	39	29	15	16	10	29	4	7	8	5	9	3	17	26	4	5	31
CZU	472	3	15	30	200	88	58	46	18	6	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
JU	137	4	5	9	8	20	14	27	25	9	6	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
MENDELU	205	16	22	36	26	57	19	11	10	1	3	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0
MU	106	0	17	18	16	21	9	6	4	3	1	3	3	0	0	0	1	0	0	0	0	1	1	0	1	1	
OU	6	0	0	1	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TUL	396	13	38	71	63	76	60	36	15	10	5	2	3	3	0	0	0	1	0	0	0	0	0	0	0	0	0
UHK	17	0	0	2	6	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UJEP	14	0	1	2	2	4	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UK	163	1	11	28	21	18	22	20	20	6	6	0	1	1	1	0	0	2	0	0	0	0	1	0	0	0	4
UP	154	9	7	24	17	8	26	14	17	9	8	1	2	7	3	0	0	0	0	0	0	0	1	0	0	0	1
UPa	52	0	2	10	6	6	5	4	5	8	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
UTB	168	2	21	32	36	25	19	13	17	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
VFU	17	0	0	5	3	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VSBT-TU	354	9	62	41	61	52	72	19	24	4	5	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
VSCHT	407	3	32	37	73	34	26	16	13	15	6	8	3	6	7	3	8	5	5	6	8	9	15	15	11	12	31
VSTE	42	0	3	11	14	2	2	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VUT	463	9	44	111	63	56	52	34	26	20	8	3	3	1	0	0	2	0	0	0	0	2	2	0	6	1	20
ZCU	194	3	8	44	45	49	15	18	5	4	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Source: Authors

3.6 *Technology Specialization*

The International Patent Classification (IPC) and Industrial Property Office of Czech Republic (UPV) Technology Classification were used in this study [1]. The IPC is a comprehensive patent classification system developed and maintained by WIPO. It provides a hierarchical system of symbols for the classification of patents according to the different areas of technology. IPCs are assigned to each patent application prior to its publication. [6]. The IPC classifies technology areas into 70,000 different IPC codes. In order to group the IPC codes into a tractable number of technology sectors we use by UPV technology classification in annual reports, which clusters the IPC codes into 32 distinct technology fields. In order to assess prolific technology areas of university patenting, we used all IPC codes listed in the patent application. The technology fields for the patent documents identified in this study are spread across all 32 technology fields. Major documents belongs to more technology fields, because 4,398 university patent documents has been identified 6,861 technology fields. In figure 6 can be seen, that technology areas with the greatest occurrence is „Measuring, optics, photography" in order to IPC section G, IPC codes G01, G02 and G03. We identified 1152 patent documents, which is nearly 26% of all documents. We studied this technology fields deeper and we investigated that 556 patent documents belongs to IPC subclass "G01N - Investigating or analyzing materials by determining their chemical or physical properties". An assessment of technology fields

suggests that universities tend to concentrate their patent filings especially in a measuring. We are not sure, how much can contribute technology area to economic growth.

Figure 5. Distribution of university patent documents in total across the technology fields

Technology Field	Value
MEASURING, OPTICS, PHOTOGRAPHY	1152
HEALTH ; LIFE-SAVING ; AMUSEMENT	486
MATERIAL PROCESSING	427
BUILDING	350
INORGANIC CHEMISTRY	348
SHAPING METAL	310
ELECTRICITY	295
TRANSPORTING, STORING	291
SEPARATING AND MIXING	282
HOROLOGY, REGULATING, COMPUTING	246
BIOCHEMISTRY, SUGAR, LEATHER	206
DYES, ANIMAL AND VEGETAL OILS	204
MICROSTRUCTURAL TECHNOLOGY,...	199
ENGINEERING IN GENERAL	185
ENGINES AND PUMPS	182
LIGHTING AND HEATING	181
ORGANIC CHEMISTRY	180
METALLURGY	173
MEDICAL, DENTAL AND HYGIENIC PREP	163
MACLOMOLECULAR COMPOUNDS	160
AGRICULTURE	146
ELECTRONIC CIRCUITS, COMMUNIC. TECH	134
TEXTIL AND FLEXIBLE MATERIALS	117
FOODSTUFFS ; TOBACCO	116
MUSICAL INSTRUMENTS, STORAGE	80
PAPER	70
PERSONAL OR DOMESTIC ARTICLES	51
PRINTING	40
EARTH OR ROCK DRILLING ; MINING	29
NUCLEAR ENGINEERING	23
WEAPONS AND BLASTING	23

Source: Authors

3.7 Trends in Technology Specialization

The average number of Czech university patents registered per technology fields has increased significantly from 98 cases in 2006 to 796 cases in 2012. The highest increasing of number of cases registered patents documents between this two years were in "measuring, optics, photography" area (from 34 cases to 189 cases), followed by "material processing" (from 7 to 98), and "horology, regulating, computing" (from 2 to 81). The highest increasing in percentage were in "inorganic chemistry" (6500%), "building" (6200%). Overall, it can be concluded that patent-activities increased in all technology fields.

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Figure 6. Distribution of university patent documents across the technology fields in year 2006 and 2012

Technology field	Range	Percentage
INORGANIC CHEMISTRY	from 1 to 65	6500%
BUILDING	from 1 to 62	6200%
HOROLOGY, REGULATING, COMPUTING	from 2 to 81	4050%
LIGHTING AND HEATING	from 1 to 38	3800%
MICROSTRUCTURAL TECHNOLOGY,...	from 1 to 27	2700%
MACLOMOLECULAR COMPOUNDS	from 2 to 45	2250%
ELECTRONIC CIRCUITS, COMMUNIC. TECH	from 1 to 21	2100%
DYES, ANIMAL AND VEGETAL OILS	from 3 to 52	1733%
AGRICULTURE	from 1 to 17	1700%
MUSICAL INSTRUMENTS, STORAGE	from 1 to 16	1600%
TRANSPORTING, STORING	from 3 to 48	1600%
MATERIAL PROCESSING	from 7 to 98	1400%
PRINTING	from 0 to 9	1000%
NUCLEAR ENGINEERING	from 0 to 7	778%
ELECTRICITY	from 5 to 34	680%
PAPER	from 2 to 12	600%
METALLURGY	from 5 to 29	580%
MEASURING, OPTICS, PHOTOGRAPHY	from 34 to 189	556%
FOODSTUFFS ; TOBACCO	from 2 to 11	550%
SEPARATING AND MIXING	from 9 to 49	544%
SHAPING METAL	from 10 to 54	540%
ENGINES AND PUMPS	from 5 to 26	520%
TEXTIL AND FLEXIBLE MATERIALS	from 5 to 25	500%
ENGINEERING IN GENERAL	from 8 to 33	413%
EARTH OR ROCK DRILLING ; MINING	from 1 to 4	400%
WEAPONS AND BLASTING	from 0,9 to 3	333%
HEALTH ; LIFE-SAVING ; AMUSEMENT	from 22 to 71	323%
MEDICAL, DENTAL AND HYGIENIC PREP	from 7 to 21	300%
PERSONAL OR DOMESTIC ARTICLES	from 4 to 11	275%
BIOCHEMISTRY, SUGAR, LEATHER	from 11 to 30	273%
ORGANIC CHEMISTRY	from 6 to 10	167%
SUBJECT MATTER NOT OTHERWISE PROVIDED	From 12 to 12	100%

Source: Authors

4 Conclusion

Before any conclusion or statement it should be recalled that university´s patent activity is but one of several channels for transferring knowledge and technology from publicly funded research which include publication, the movement of graduates, conferences as well as informal channels. The most interesting result of this study is fact that patent activity decreased when evaluation of patents and non-publication results of the applied university research has been changed for years 2013 - 2015. This methodology valid for year 2013-2015 aims to remove several criticized shortcomings of the current result evaluation system, which are causing inefficiency in the funding of research [5]. This methodology seem to be success, because activity in utility model filing decreased in range 26% (from 583 cases in 2012 to 426 cases in 2013), but slightly increased activity in patent applications filing (from 213 to 270). The obtained results showed, that universities as public research institutes are focused especially on utility models. It can be interpreted so that universities are more developing (or are more able to develop) the technical solution with lesser economic importance. The results of these study showed, that university patenting is highly influenced by methodology of evaluation of the results of research organizations and results of finished programs approved by Office of the Government of the Czech Republic. The patent activity decreased after year 1990 and patent activity has been low for many years. The situation has been change, when patent documents has been included into the methodology of evaluation of the results of research organizations and results of finished programs in year 2004, where pillar evaluation of patents and non-publication results of the applied research) has been added into the methodology. Czech universities directs its research to „Measuring, optics, and photography" followed by "health, life-saving, amusement technology". In latest year we can considered increasing patent activity

in following technology fields: ''inorganic chemistry'', ''building'', "Horology, Regulating, Computing", "Lighting and Heating" and „Nanotechnology". On the base of this results, we can predict, that commercial potential of university patents is limited. The greatest occurrence is „Measuring, optics, and photography" where can be supposed, that economic potential is low. In other mentioned technology fields exit certain potential for commercialization. Especially in „health, life-saving, amusement" technology field, which has the greatest occurrence for example in Australia (Commonwealth of Australia, 2013). But on the base of used metrics in this study cannot be fully evaluated commercial potential of university patents and their impact and follow on innovation. Such an assessment can be undertaken efficiently only by relying on the identification, analysis, interpretation and visual representation of patent datasets with using qualitative metrics for determining the scope and impact of patents. The interesting metrics related to commercial potential is geographical filing breadth and assesses collaboration between university entities and other partners. If any potential partner will appear or the university decided about secondary filing in more countries, it can be supposed that invention has commercial potential. Filing only Czech patent application has absolutely no commercial potential and it is only limitation for Czech spin-offs entities, because inventions are on other territories freedom to operate. But information about geographical filing breadth are not available at the database of the Industrial Property Office of Czech Republic

Acknowledgements

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