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# Current Trends in Public Sector Research

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## Prologue

It is my pleasure to have been invited as keynote speaker at the 2018 Conference on “Current Trends in Public Sector Research” organized by Masaryk University’s Department of Public Economics. I am also delighted to provide a prologue to these Conference’s proceedings.

In my keynote address to the Conference, I briefly surveyed the extensive literature on Political Budget Cycles (PBCs) in local finances, providing also some contextual background and presenting avenues for future research. Political Budget Cycles occur when political motivations induce politicians to take actions that cause fluctuations in budget balances or in other fiscal variables (at the national or local level). Cycles may be opportunistic, as when pre-election stimulus enhances incumbents’ reelection prospects, or partisan, as when incoming parties reverse the policies of predecessors with different ideology. In my keynote address, the focus was on opportunistic cycles.

The first theoretical models and empirical studies (Nordhaus, 1975) focused on Political Business Cycles (on economic activity), but the rational expectations revolution and lack of strong empirical evidence led to a shift in focus towards budget cycles. Rogoff and Sibert (1988) developed a rational opportunistic model in which voters have rational expectations but are unsure of the “competence” of politicians. The model can produce an equilibrium in which incumbent politicians increase government spending in pre-election periods in an effort to signal competence, that is, the ability to supply more government services with a given revenue. Rogoff (1990) later developed a similar model where the incumbent strategically manipulates the composition of expenditures in pre-electoral years, by favoring items that are more readily visible to the electorate. Following these contributions, several theoretical models and empirical studies examined the possible occurrence of political budget cycles, highlighting circumstances under which incumbents conduct fiscal manipulation to increase re-election prospects (see Dubois, 2016, for a survey).

Regarding the empirical research at the national level, the main conclusion is that cycles do not occur everywhere and all the time. That is, PBCs are context-conditional (de Haan and Klomp, 2013). Among the main conditioning factors are the age of democracy, the share of uninformed voters, the degree of fiscal transparency, the electoral system, the closeness of elections, and media freedom (Veiga et al., 2017).

Since the 1990s, many empirical studies tested for the presence of PBCs using subnational data, rather than cross-country data. This has several advantages. First, there is greater homogeneity of institutional rules than for panels of countries. Second, as the number of subnational units is generally large, studies using subnational data generally have many more observations than panel country studies. Third, election dates are exogenous from the perspective of local governments, which is not always true for national governments. Finally, it is generally easier to obtain comparable data on the composition of expenditures and revenues of local governments than of national ones.

There are studies of PBCs in local finances for many countries, with varying results. Most studies show that expenditures tend to increase prior to elections, some find evidence of decreasing taxes, while others only find evidence of compositional changes in spending. Several studies go one step further by analyzing the effects of opportunism on votes. For example, Aidt et al. (2011) present evidence of a two-way relationship between the opportunistic distortion in spending and the expected margin of victory in the next elections.

I finalized my address indicated some unsettled issue, which constitute interesting avenues for future research. These include strategic debt management, the effects of binding term limits to local officeholders, the effects of institutional changes/reforms, optimism bias in

budget forecasts, overlapping electoral cycles and simultaneous elections, and how to better deal with endogeneity issues.

Francisco José Veiga

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President of the European Public Choice Society*

### **Background Literature**

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**SESSION I:  
PUBLIC ADMINISTRATION  
AND PUBLIC SECTOR**

# Risk Management as an Essential Element of the (New) Public Management in Poland – Selected Issues

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## Abstract

This article aims at presenting selected issues related to risk management in the public sector in Poland. Risk management is an integral element of the new public management (NPM) concept. On the one hand, the article is of theoretical nature and on the other one it points out to a utilitarian dimension of the knowledge presented. Particular attention is paid to the problem of management control and internal audit as selected areas of the contemporary Public Risk Management (PRM) concept. Additionally, the article presents some fragment of the empirical research that was conducted in Polish publicly maintained hospitals that from the legal perspective belong to entities of the public finance sector. Moreover, an overview of the relevant scientific literature is made along with the analysis of related normative regulations that are applied in Polish public management. The article employs a method of synthesis. It also points out to selected methodological aspects and the processual approach to risk management in entities of the public finance sector in Poland.

*Keywords: risk management; public management; management control; internal audit; public hospitals*

JEL Classification: D81, H12, H83, I18, M41, M42, P35

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## 1 Introduction

Risk management has recently become an integral element of public management in the world [27]. This also applies to Poland where risk management is statutorily regulated by the 2009 Public Finance Law [1] and relevant announcements issued by the Minister of Finance that mainly refer to standards of management control and internal audit [4, 5, 11]. However, regardless of statutory regulations and detailed guidelines, in Polish organisational practice management control and internal audit have been important areas of risk management within the New Public Management (NPM) concept for many years. The most important objective of both management control and internal audit is therefore to maximise effectiveness of the way entities of public finance sector function and to provide them with sustainable development. The prerequisite to meet the objective formulated this way is based on well designed, implemented and currently monitored mechanisms of risk management.

The article aims at demonstrating issues related to risk management understood as an integral element of the contemporary concept of public management that in Poland is perfectly supplemented with another detailed concept, i.e. Public Risk Management (PRM) [27]. The authors wish in particular to present risk management in Polish entities of the public finance sector as an important function of the New Public Management (NPM), which, on one hand, refers to implemented mechanisms of management control and on the other hand to internal audit. The article presents selected issues solely in a synthetic manner.

It also points out to selected methodological aspects and the processual approach to risk management in entities of the public finance sector in Poland.

## 2 Material and Methods

The article is of theoretical nature although it also highlights utilitarian aspects of the knowledge presented. The research methods employed are mainly based on literature studies,

overviews of regulations and reasoning. This article corresponds with a well-established trend of research into risk conducted by its authors in the context of public management, accounting, internal control and audit in Polish entities of the public finance sector. In its empirical part, the article is focused on some results of the empirical research conducted in the group of selected Polish publicly maintained hospitals. In the research conducted a questionnaire that was complemented by means of a direct interview was employed as a research method [26]. A research sample consisted of randomly selected Polish publicly maintained hospitals [26]. The research was of pilot nature and it was carried out from the managerial perspective in the group of directors who managed the entities involved [26]. It is necessary, however, to highlight that managers of the publicly maintained healthcare sector have to be perceived here as one of numerous general categories of public managers in the world [26]. The scope of the research conducted predominantly referred to methodology of risk management in publicly maintained hospitals [26]. The research particularly focused on the mechanism of risk occurrence in the case of the entities of the public sector mentioned above [26]. In addition, the research employs the Internet as a source of information concerning Polish public organisations. The synthesis method was used to formulate the final conclusions.

### **3 Results and Discussion**

In Poland in entities of the public finance sector risk refers to all tasks that are undertaken by the entities in question, i.e. on one hand to tasks that are obligatory and result from legislation and on the other hand to those tasks that are contracted by government administration entities. The risk involved is mainly connected with exceeding financial plans, using and settling subsidies received from public sources improperly, breaching discipline of public finance, lowering quality of public services provided, increasing payments for the services provided, misinvesting public means or abandoning public investment and increasing negative impact of investment on the natural environment. Hence, all *in minus* deviations of different types observed in this regard may be perceived as risk [27] although the theory of management science defines risk in a slightly different way [6, 7, 8, 9, 12, 13, 14, 15, 20, 21, 26, 28, 29]. In Poland in practice risk management has been an important element of the way entities of the public finance sector function for many years. Risk management is an integrated system that provides the organisations involved with correct, effective and efficient realisations of their objectives set. To some extent, risk management is a modern tool of public management and a measurable effect of the process that adjusts Polish law to regulative requirements of the European Union. In particular, the Public Finance Law that has been in force since 1 January 2010 replaced financial control with management control and defined the management control objectives along with tasks and duties of the entity head with regard to overall activities of the entity. Management control as manifestation of the new public management being realised is to improve functioning of entities in the public finance sector and base this functioning on the business model in which long-term management and rational use of human resources, fixed assets, financial resources and IT resources play an important role. Management control emphasises mission and objectives realised by entities of the public finance sector along with adequate risk management in all areas in which the entities function [24]. That is why, risk management is one of the legally defined objectives of management control. However, it is worth noting down that the notion of management control implemented to replace financial control has not introduced any significant changes in the context of risk management in the public finance sector in Poland. This may be confirmed by the overview presented in Table 1 that compares financial control standards with management control standards that define major aspects of risk management in the sector of public finance in Poland.

**Table 1. Risk management in financial control and management control standards in Poland (Source: Authors' elaboration based on: [4], [5])**

Financial control standards (2006)	Management control standards (2009)
<p><b>B. Risk management</b> While meeting its objectives each entity faces risk. Risk management aims at increasing probability of meeting objectives. Risk management standards (points 6-9) point to indispensable elements of this process.</p> <p><b>6. Setting objectives and monitoring realisation of tasks</b> In a given entity at least an annual plan of work is drafted to identify particular objectives and tasks of the entity in question, measurable indexes or criteria of their realisation, organisational units that are responsible for their realisation and resources that particularly include human resources, financial resources and fixed assets necessary to realise the objectives set. Head of the entity and designated employees perform ongoing assessment (monitoring) of the realisation of tasks by means of pre-defined indexes or criteria.</p> <p><b>7. Risk identification</b> Systematically, at least once a year, identification of internal and external risk related to particular objectives and tasks of the entity is performed. Those risks refer to both activities undertaken by the whole organisation and activities undertaken by the entity within particular programmes, projects or tasks. In the case some major change of conditions in which the entity functions is observed, identifications of the risk involved is repeated.</p> <p><b>8. Risk analysis</b> Risks identified are subject to some analysis that aims at identifying potential effects and probability that particular risks will have to be faced. Head of the entity involved or authorised employees identify and determine accepted levels of risk.</p> <p><b>9. Reaction to risk and countermeasure actions</b> Type of reaction towards each major risk has been identified (tolerance, deferral, withdrawal or action). Head of the entity involved or authorised employees identify actions to be taken in order to diminish risk to accepted levels.</p>	<p><b>B. Objectives and risk management</b> Clear identification of the mission may facilitate identification of the hierarchy of objectives and tasks and effective risk management. Risk management aims at increasing probability that objectives will be met and tasks realised. Process of risk management should be documented.</p> <p><b>5. Mission</b> It is necessary to take into account a possibility of identifying the objective to be met while establishing a particular entity. This objective should take a form of a short and synthetic description of the mission. Mission of a ministry should refer to departments of government administration headed by the relevant minister and mission of the territorial self-government entity respectively to this entity.</p> <p><b>6. Identifying objectives and tasks, monitoring and assessing their realisation</b> Objectives and tasks have to be defined clearly and at least a year in advance. Their realisation should be monitored by means of identified measuring tools. In a superior or supervising entity it is necessary to provide an adequate system that would allow for monitoring realisation of objectives and tasks undertaken by subordinate or supervised entities. It is recommended to perform assessment of realisation of objectives and tasks that would include criteria of economy, effectiveness and efficiency. It is necessary to make sure that while identifying objectives and tasks relevant units, organisational departments or individuals are identified to attribute direct responsibility for their realisation and to allocate adequate resources.</p> <p><b>7. Identification of risk</b> At least once a year it is necessary to identify risk that refers to objectives and tasks. In the case of government administration departments or territorial self-government administration entities it is necessary to take into account that objectives and tasks are also realised by subordinate or supervised units. In the case some major change of conditions in which the entity functions is observed, identifications of the risk involved is repeated.</p> <p><b>8. Analysis of risk</b> Identified risk should be subject to analyses that aim at identifying probability of risk occurrence and potential effects of the risk in question. It is necessary to set an accepted level of the risk.</p> <p><b>9. Reaction to risk</b> With reference to each major risk one should define a type of reaction (tolerance, deferral, withdrawal or action). It is necessary to identify actions that should be taken in order to diminish particular risk to its accepted level.</p>

As it may be concluded from Table 1, in Poland standards of both financial and management controls define basic requirements that refer to broadly understood internal control employed in the sector of public finance. Standards that refer to general principles of risk

management, i.e. those from 2006 and 2009 emphasise that risk management aims at increasing probability that goals and tasks will be realised by all entities of the public finance sector. At present, standards that have been in force since 2009 put some emphasis on the fact that in entities of the public finance sector identification of the mission may facilitate identification of the hierarchy of objectives and tasks and effective risk management. Therefore, it is possible to observe that for over 12 years Polish entities of the public sector have legally been obliged to implement the process of risk management. Firstly, they have to identify risk in the context of their objectives and tasks at least once a year. Secondly, their risks identified have to be analysed in order to identify probability of occurrence of a particular risk and its potential effects. Thirdly, the entities in question identify accepted level of risk. Fourthly, with reference to each major risk they select a type of reaction undertaken. In compliance with the standards presented above (Table 1) the process of risk management should be adequately documented paying attention to specifics of a particular entity of the public finance sector, its organisational and legal form, size, type of activities undertaken, awareness and competences of its head and other employees including chief accountant and internal auditors in particular. Internal procedures that refer to risk management and that are adopted by the organisation should define the course of the risk management process, adopted methodology of identification and analysis of the risk involved and the scope of authorities, tasks and responsibilities of all individuals involved in risk management [19]. Analysis of practical solutions that was conducted on the basis of data that come from Internet resources held by selected entities of the public finance sector allows for concluding that in Poland risk management principles take form of detailed procedures of risk management, i.e. regulations or instructions. These procedures usually refer to the following aspects: objectives of risk management, principles of risk identification, methodology of risk analysis, ways of addressing identified and quantified risk, principles of monitoring the process of risk management and the scope of responsibility for risk management [25]. Additionally, it is necessary to highlight that effective and efficient mechanisms of risk management allow heads of entities of the public finance sector for obtaining information about potential threats (understood as potential possibilities that their entities may face some losses) that may result in failure to realise already planned tasks as a result of a mistake, fraud, ineffective action, coincidence or force majeure [10].

Risk management in entities of the public finance sector – as it has already been clearly stated – is directly connected with internal audit. Internal audit involves systematic and methodological assessment of risk management processes, management control and corporate governance, thus contributing to improvement and perfection of the processes in question [2, 17]. Pursuant to Polish legal regulations internal audit involves independent and objective activities that aim at supporting heads of entities functioning in the public finance sector in realisation of their objectives and tasks by means of systematic assessment of management control (ensuring activities) and by means of consulting [1]. Internal audit is carried out by a duly authorised auditor who is employed by a particular entity or by an external contractor provided they meet legally defined criteria. In particular, an external auditor plays a major role in supporting and improving processes of risk management in the very entities [2]. Professional support related to employment of methods and techniques of risk analysis is provided. Table 2 presents the most important elements of risk management in the internal audit context.

**Table 2. Risk management in standards of financial control and management control in Poland (Source: Authors' elaboration based on: [11])**

<b>Plan of the internal audit</b>	<b>Realization of the audit task</b>	<b>Internal audit report</b>	<b>Monitoring of realisation of recommendations and verifying activities</b>
While developing an audit plan, an internal auditor carries out risk analysis that includes the way risk is managed in a given	An internal auditor identifies risks in selected areas of activities undertaken by the entity and then	An internal auditor presents all arrangements and formulates recommendations on the basis of the analysis of acquired evidence and	An internal auditor verifies realisation of recommendations (monitoring of realisation of

<p>entity (getting familiarised with a register of risks, assessing particular risks and checking which levels of risks are accepted by the head of the entity) A map of risk that is created by an auditor or / and a list that groups particular areas of activities undertaken by the entity according to importance of risks identified allow an internal auditor for making a decision to select areas where audit tasks are going to be realised.</p>	<p>assesses those risks taking into account probability of their occurrence and effects that they may have. An internal auditor also checks designed mechanisms of management control. An internal auditor focuses his actions on areas in which the highest risks were identified – risks that may threaten realisation of objectives and tasks.</p>	<p>performed tests. In order to formulate recommendations an internal auditor may perform an analysis of reasons for problems and of resulting effects. An internal auditor is expected to point out any potential results of not realising formulated recommendations (the so-called risk of negligence of corrective measures).</p>	<p>recommendations) and assesses effectiveness of the activities implemented on the basis of the recommendations made (to which extent recommendations realised have diminished or reduced the risks in question) (verifying activities).</p>
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The analysis of the contents presented in Table 2 allows for concluding that elements of risk management are attributed to all stages of the internal audit being performed in entities of the public finance sector. An internal auditor performs a detailed analysis and effective assessment of the risk management processes. This way heads of entities are supported in their efforts aimed at maintaining adequate mechanisms of management control [2]. Simultaneously, an internal auditor should not try to identify the so-called appetite for risk, take role of the risk controller or make decisions concerning responsibility for risk management (for instance, with reference to government administration or self-government entities it is possible to observe that in practice they are at the stage of improving internal regulations that refer to management control and they do not always follow internal auditors' recommendations). In the relevant scientific literature issues of risk management in public management are still hardly examined. However, several attempts have already been undertaken to address risk in the public sector globally [12, 15, 27]. This results from the fact that risk management is to some extent management of nothing [21], which predominantly refers to the very issue of the public risk category and its particular forms that are frequently difficult to identify [27]. Therefore, the empirical research conducted in this respect refers to selected issues of public risk that are often interconnected with other economic categories, e.g. innovations undertaken by public organisations including entities that provide medical services [7, 13, 14, 20].

In the world managers of public risk are directly responsible for risk management [27]. In Poland, however, this type of an executive function in the sector of public finance is neither commonly known nor applied. This can be confirmed by the extensive research conducted by Polish researchers who deal with the phenomenon discussed [3]; it is also confirmed, for instance, by results of the empirical research conducted in Polish publicly maintained hospitals that are statutorily included in the group of Polish entities of the public finance sector [26]. Similarly, like in the case of other public organisations of the sector, in Polish publicly maintained hospitals risk management is usually limited to management control and internal audit. In public management in Poland methodological repertoire suggested by the literature of the field is not fully exploited, which particularly refers to the question of risk quantification [26]. In the context of partial results of the empirical research in Polish publicly maintained hospitals as many as 28% of their managers claim that organisational practice does not call for any necessity for risk management, 16% of them believe that it is not possible to completely identify impact of risk on hospitals, another 4% of respondents think that there is no risk that would be high enough to be dealt with directly and 8% of them state that traditional methods of hospital management are sufficient [26]. The other part of respondents do not have any opinion at all [26]. In a majority of Polish publicly maintained hospitals subject to this research, risk is managed in a traditional way, i.e. by means of insurance or special reserves (44% of the

hospitals subject to this research create this type of reserves) [26]. It is necessary to highlight here that in the case of public management in Poland insurance is perceived to be a classical example of the method that is used to finance risk of entities in the sector of public finance. This results from business solutions that are applied in those entities in Poland and that are characteristic for the very NPM concept.

### **3 Conclusion**

The above considerations allow for concluding that risk management in entities of the public finance sector in Poland is mainly of procedural nature and it relates to implemented mechanism of management control and internal audit. Simultaneously, effective risk management in entities of the public finance sector is not an easy process. Executives including public managers are required to get involved. In Poland risk management is a link that connects numerous important elements that make up a formula of public management, particularly including specific actions that are undertaken by controllers and internal auditors. Risk management is however a prerequisite of effective management of public organisation, its development, cooperation with business entities and reaction to different types of crisis situations in the sector of public finance. From the perspective of social responsibility of the entities in this sector risk management may also be perceived as a guarantee of an increase in trust of the society to public institutions because it allows for eliminating or minimising inefficient actions, mistakes or frauds. In the Authors' opinion, it is necessary to look for a broader time horizon in order to perform any assessment of the qualitative change in management of Polish entities of the public finance sector in the context of the New Public Management (NPM) concept. The most important mission of the NPM is therefore to increase effectiveness and efficiency of the way entities in the public finance sector function [18]. Heads of the entities in question should be oriented towards establishment and realisation of missions, strategic objectives and tasks of their entities and they have to pay particular attention to results of their actions undertaken. Such actions shall allow for abandoning a rigid, traditional (bureaucratic) model of managing entities in the sector in question in order to adopt strategic and task oriented management [22]. In the literature of the subject numerous authors point out that implementation of the NPM concept in practice requires some focus on modern methods of long-term strategic planning in the budgeting process and on effective management of risk and public tasks. Additionally, it is required to use tools that would match realisation of the task-oriented budget, performance budget and result-oriented budget [23]. From the perspective of the public finance sector correct financial planning in public organisations in Poland seems to be of much importance in the context of issues discussed in this article. However, one should not forget that there are other areas of management of public organisations. This stems from the very specifics of the public finance sector and from major objectives of particular organisations involved. The very profile of risk to be faced by particular organisations while performing their activities is really important and it has to be taken into account while identifying and quantifying risk that is specific for each organisation. This makes up one of the foundations of the contemporary PRM concept that, in general, well corresponds with public management not only in Poland but also in the whole world – especially in the context of the NPM and similar concepts, which at present mainly refers to the Governance. Hence, theoretical considerations made in this context will have to be significantly intensified and more empirical research should be called for.

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# Group Membership and Gender Competitiveness

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## Abstract

Nowadays, women represent larger percentage of positions in political life and private sector than ever before. Nevertheless, they still remain underrepresented in the leading positions of political systems and corporations. Also, the percentage of women in the Czech political life is still relatively low. The lack of women in government, positions of presidents and prime ministers or other leading functions at all can be partly explained by their lower willingness to enter a competition in comparison with men. Further to the studies showing that women are equally skilled, educated and productive, the question arises how to encourage qualified women to compete. The analysis of the information gathered via conducted laboratory experiment shows that inducing a team identity (group membership) and team payoff increases competitiveness of high-performing women without loss of willingness to compete of high-performing men. In addition, no significant (neither positive nor negative) change in the performance among both men and women was found.

*Keywords: gender differences in competitiveness; experimental economics; group identity; women in politics; women on boards*

JEL Classification: C92, J16

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## 1 Introduction

Nowadays, women represent larger percentage of positions in political life and private sector than ever before. [21] Nevertheless, they still remain underrepresented in the leading positions of political systems and corporations. [14]

The percentage of women in the Czech politics is still relatively low. Only 12% of women is part of the current government, and positions of the president and the prime minister have been held only by men. Currently, 20% of the Senator posts is occupied by women and 24% of women represents Czech Republic in the European Parliament. [11] These numbers are in line with under-representation of women in the leading positions in private sector in contrast with high level of their education. [12]

As for the representation of women in leading positions, one of the fundamental research on board governance was published by [1] examining the relationship between board effectiveness and a gender diversity, which was measured via the share of female directors on the board. They found that the gender composition of the board is positively related to the board effectiveness measures. In particular, the gender diversity has significant effects on its governance and women are less likely to have attendance problems. This study was supported by many others. [15][13]

The need for representation of women in politics can be also supported by [19] commenting on benefits of diversity in teams. They suggest that if there is a demand to build teams or organizations capable of innovating it is necessary to bring diversity as diversity enhances creativity, encourages the search for novel information and perspectives and leads to better decision making and problem solving.

The lack of women in government, positions of presidents and prime ministers or other leading functions at all can be partly explained by their lower willingness to enter a competition in comparison with men. Various experimental laboratory studies have shown that women, on average, respond less favorably to competition compared to men albeit women are often equally productive. For example [17] states that women, on average, are less willing to compete compared to men despite the fact that they evince similar productivity or performance.

According to the experiments conducted [16][9], not many women enter the competition when they face the decision between being paid according to their individual performance or being paid in competition with others. Further laboratory and field experiments based on similar tasks confirmed these findings. [8][5][4][22][20][18]

Following these studies showing also that women are equally skilled, educated and productive, the question arises how to encourage qualified women to compete. Since avoidance of entering competition might cause loss of high-ability workers (high-performing women) in certain (not only political) positions and jobs which might cause hidden costs for the society.

Thanks to the laboratory experiment it should be possible to identify a viable solution for motivating women to be more eager to compete in the public sector as well as in the private sector. Moreover, the analysis of information gathered via experiments brings the answer to the question whether inducing a team identity (group membership) and team payoff increases competitiveness of women and how or whether the group membership and team payoff affects their performance (as opposed to willingness to compete) under competition.

The experimental design that built on [16] was utilized with methods described for example in [6] to induce the team identity. The experiment consisted of five stages. Subjects were solving a real task (adding up sets of five 2-digit numbers), under either a non-competitive piece-rate payoff or a competitive tournament. Subsequently, they faced to the choice which of the two system of payoff they want to apply for the next task. The treatment session included in addition a team identity induction at the beginning of the session. Subjects were randomly divided to groups of four and a team identity was introduced via creation of the team flag.

Participants were not aware of the identity nor performance of the other members of their team. They were only aware of the fact, that their earned payoff would be distributed among the other members of their team while they would earn a part of the payoff of the other members of their team in return.

### ***Research Questions***

I sought to answer the following two questions within the experiment conducted:

- Does introduction of a team identity and team payoff increase competitiveness of women and if so, how?
- Does the team identity and team payoff affect their performance under competition?

The main results are as follows. With induction of a team identity and team payoff (via random division of subjects into team and strengthening the team identity through creation of the team flag) difference in willingness to compete could be observed among women, in particular, among high-performing women.

On the other hand, no change in preferences whether to choose a competitive or non-competitive payment scheme could be noticed among low-performing women. In addition, change in preferences in willingness to compete among men could be observed only within the low-performing men – their willingness to enter the tournament significantly declined. According to the analysis of the data, it was not able to observe any significant (neither positive nor negative) change in the performance among both men and women.

The remainder of the paper is organized as follows: In the next section the design and experimental procedures are introduced. In Section 3, the results are presented and analyzed, and Section 4 concludes and brings next potential steps for the research in this area.

## **2 Material and Methods**

The design of the conducted experiment is established on the [16]. Three sessions were carried out – the *control* session (replication of [16]), the *treatment\_info* session (subjects were presented with indication regarding average performance on the task they solved) and the *treatment\_info\_team* session (in addition to the indication obtained, subjects were divided into the teams and their performance influenced payoff of the team and their individual payoff was influenced by the performance of other team members too).

Each session consisted of five stages. In the first three stages subjects were performing a real task (adding up sets of five 2-digit numbers) under a competitive (tournament) or non-competitive (piece rate) payment scheme. Subsequently, they were tested on their risk preferences and confidence.

The experiment was conducted at the Masaryk University with 64 subjects (32 males and 32 females) recruited via hroot [3] and the experiment was programmed in otree [7]. Each of the participants received a CZK 50 show-up fee. Moreover, participants were told that they would be asked to complete five tasks, and that one of the first three tasks and one of last two tasks would be randomly chosen for payment at the end of the experiment. By paying two of the tasks randomly I decreased the chance that subjects would focus only on some of the tasks.

At the beginning of each session, subjects were randomly seated at computers. Participants were informed regarding rules of the tasks only immediately before each of the stages. Subjects were not informed of their relative performance and payoff during the session. They were informed only of their absolute performance on each task, (number of correctly calculated tasks).

## *2.1 Experimental Design*

The main task of the experiment was adding up sets of five 2-digit numbers. Subjects were not allowed to use mobile phone nor calculator and the sets of numbers were drawn randomly. After submitting an answer, a new equation occurred together with information whether the previous calculation was solved correctly. Tasks to measure risk preferences and confidence of participants were added after performing the main tasks as well as the basic questionnaire regarding gender, age, nationality etc.

Each session consisted of identical numbers of males and females. Even though the gender composition was not mentioned, it was observable when waiting before the session. At the end of the experiment, a number from 1 to 3 and a number from 4 and 5 were randomly selected to choose the tasks for the payment. Each session lasted about 45 minutes, and participants earned on average CZK 244.

### ***Control session***

At the beginning after introduction of the instruction, subjects had two minutes for the practicing round. This part did not influence their payoff nor the following stages. Then subjects should solve the following tasks:

Task 1 – Piece Rate: Participants were solving the 5-minute adding up sets of five 2-digit numbers. The payoff for this task (if selected for payment) would have been CZK 10 per correct answer.

Task 2 – Tournament: Participants were solving the 5-minute adding up sets of five 2-digit numbers. The payoff for this task (if selected for payment) would have been as follows: subjects would have been randomly paired with another participant of the session. The participant who solved more correct problems received CZK 20 per correct answer and the other participant received null (in case of ties both of them received CZK 10 per correct solution).

Task 3 – Choice of the payment scheme: Prior to the performance of the task same as in previous rounds, subjects were asked to select whether they prefer the piece rate payoff, i.e., CZK 10 for correct answer, or the tournament payoff. If the tournament payoff was chosen the participant received CZK 20 per correct answer if the number of correctly answered solutions in this task exceeded the number of correctly solved tasks in task 2 of randomly chosen opponent, otherwise the participant received null (in case of ties the participant received CZK 10 per correct answer). Thus, in the tournament payoff in the task 3 the performance of subjects who chose the tournament payoff was compared to the randomly assigned performance of another subject from the task 2. In other words, the choice of the tournament payoff of one subject could not affect a payoff of anybody else.

Task 4 – Guessing of ranking: Subjects were asked to guess their ranking (according to their performance among others) in the Task 1 and Task 2 to estimate the role of confidence in entering the competition. Subjects were awarded CZK 50 per each correct (+/- 2 ranks) guess.

Task 5 – The risk preferences were measured using a design based on [9]. Subjects made a series of choices between a lottery, which paid CZK 120 or 0 with 50% probability each, and a safe payment. The safe payment varied across choices, gradually increasing from CZK 0 to CZK 120 in steps of CZK 10.

Before the end of the experiment the summary table with performance and potential payoff of all performed tasks occurred on the screens of participants. Subsequently, participants were informed which two tasks were randomly chosen for the payment and what their payment should have been.

### ***Treatment\_info session***

The treatment\_info session included the same stages as described in the control session; however, after performing the first task of the session (Piece Rate) information regarding the average performance of similar subjects in this task was presented. This information was mentioned on the screen with individual performance of every subject and was not emphasized nor further repeated in any way. The number presenting the average performance of similar subjects represented the Piece Rate average performance from the Control session.

Information regarding the average performance on the adding up task as presented here serves as an analogy to general knowledge of one's chances in real life when for example applying for a job or considering a candidacy in politics.

### ***Treatment\_info\_team session***

The treatment\_info\_team session consisted of the same stages as described in the control session including the information regarding the average performance of other subjects as described in the treatment\_info session.

Moreover, team identity was induced at the beginning of the session. Subjects were randomly divided to groups of four and a team identity was introduced via creation of the team flag. Subjects weren't aware of the identity of other team members and the teams remained of the same composition during the whole session.

Before the first stage, subjects were informed that for some parts of the experiment they had been randomly divided to teams of four. The team was same for the whole session and in the team-stages their payoff should have been influenced by performance of other team members. Subsequently, subjects were invited to create their team flag. Each subject should have chosen from a set of symbols and his or her symbol was placed on the team flag. In the team-stages the group identity was strengthened by displaying the team flag on their screens.

During stages one to three subjects were performing the same tasks as in the control session; however, their payoff was evenly divided among the team. In other words, if one of the tasks 1 to 3 was chosen for payment then payoffs of all members of the team were put together and evenly divided among all members of the team of four. Induction of a team identity and team payoff represents a lot of everyday situations when people are making different level of effort as individuals, however, members of some group or team benefit from the result (payoff).

## ***2.2 Statistical analysis***

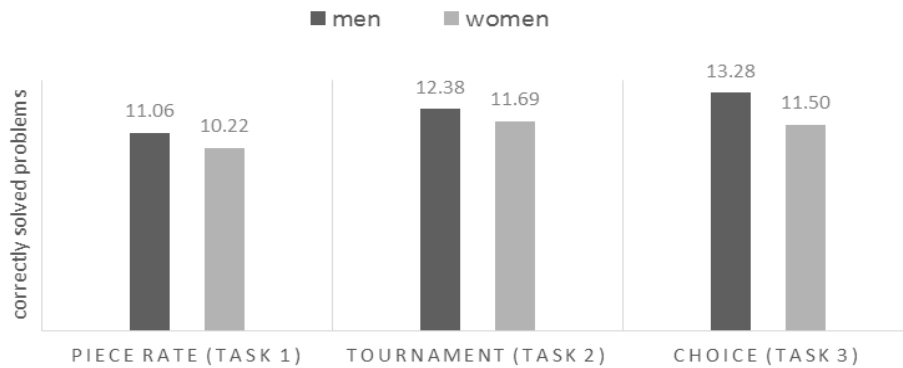
Basic descriptive statistics were used to characterize the sample data set. Statistical significance of differences categorical parameters was assessed using the Fisher's exact test, for continuous variables two-sided t-test was used (moreover, there were no cases when the conclusions of the t-test differed from those of a Mann-Whitney test). All statistical tests were performed at the significance level of  $\alpha = 0.05$ .

### 3 Results and Discussion

As for the overall performance in adding up task, men and women solved on average 11.06 and 10.22 problems respectively under the Piece Rate (Task 1), under the Tournament (Task 2) they solved 12.38 and 11.69 problems, and 13.28 and 11.50 problems on average when choosing the payment scheme (see the Figure 1). The gender difference in performance was not significant in any of the cases (Piece Rate:  $p = 0.420$ ; Tournament  $p = 0.565$ ; Choice  $p = 0.137$ ).

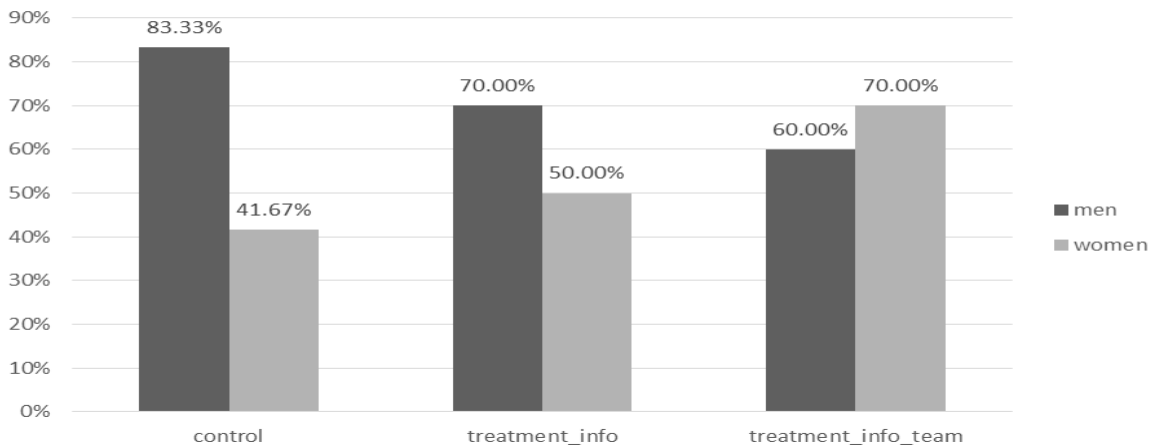
Although average performance slightly increased in comparison with the piece rate, this is probably driven more by experience and learning effect. [17]

**Figure 1. Average performance in the first three tasks according to the gender (Source: Author)**



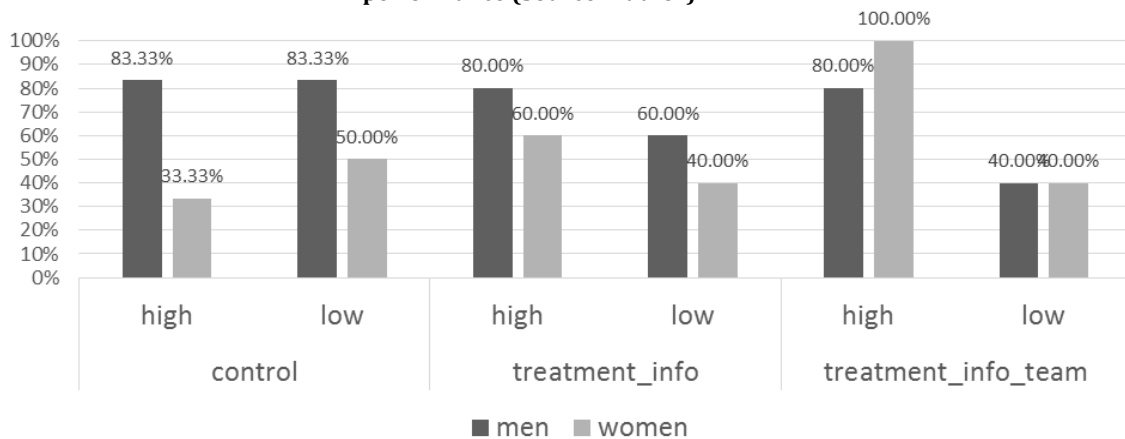
As the differences in performance were not significant the expected choice in the payment scheme (Task 3) would be similar for both men and women. Fisher exact test showed no statistical significant difference between men and women choosing a tournament payment scheme (control group  $p = 0.089$ ; treatment\_info  $p = 0.650$ ; treatment\_info\_group  $p = 0.999$ ). However, in the control session a gender gap in choosing the tournament payment scheme can be observed in the control session, statistical non-significant result may be due to a small number of subjects in the sample (see Figure 2).

**Figure 2. Percentage of subjects who chose a tournament payment scheme in Task 3 (Source: Author)**



In the control session, 83% of men and 42% of women chose to enter the tournament. This gender gap is in line with conducted studies with the same of similar design. These results are partly explained by differences in performance and confidence in probability of winning the tournament (with men having significantly higher beliefs regarding their relative performance compared to women). As displayed on the Figure 3, most of men decided to enter the tournament regardless to their relative performance. (Subjects performing better than average in total in their session were labeled as “high-performing” and subjects performing worse were labeled as “low performing”).

**Figure 3. Percentage of subjects who chose a tournament payment scheme in Task 3 according to their performance (Source: Author)**



Risk aversion is mentioned as another cause with minor effect. The residual cause of the difference in willingness to entry tournament is tagged as gender difference in competitiveness. [17]

In the treatment\_info session, the gap in entering the tournament approximately half-sized and 70% of men and 50% of women chose to enter the tournament. This change should be caused by the fact that subjects were informed about the average performance of similar subjects in the same task. We can observe in the Figure 3 that low performing men decreased their willingness to enter the tournament probably due to the fact that they realized their lower probability to win the tournament. Conversely, number of high-performing women (with higher expected earnings) who decided whether to enter the tournament almost doubled.

The gender gap in entering the tournament closed absolutely in the treatment\_info\_team session with 60% of men and 70% of women choosing the competitive payment scheme in the Task 3. In other words, more women than men chose to enter the tournament. In this session the individual decisions and performance influenced individual payoff as well as the payoff of other members of the randomly created teams. Compared to the previous two sessions high-performing men entered the competition to the same extent, however, the percentage of low performing men who decided to enter the tournament decreased to 40%. The same percentage of low-performing women chose to enter the tournament in the Task 3 (40%) and finally, all high-performing women chose the competitive payment scheme when the team identity and team payoff was induced to this experiment.

Further to the collected data we can observe that presentation of average performance to participants did not discourage high-performing men from entering the tournament and moreover, encouraged part of high-performing women to choose the tournament payment scheme instead of the piece rate.

Furthermore, all high-performing women attending the treatment\_info\_team session chose to enter the tournament while the part of high-performing men choosing the tournament remained the same as in previous sessions (80%). Low-performing men and women rather opted for the non-competitive piece rate payment scheme and only 40% of them selected the tournament.

To conclude, it could be suggested that induction a group membership and team payoff with emphasis on the team identity motivates high-performing women not to be afraid to enter the competition while indication regarding their relative performance is presented. On the other hand, no change in decision of high performing men could be observed. Although willingness to enter the competition of low-performing women remained almost the same, choice of the competitive payment scheme by low-performing men decreased approximately to a half (from 83.33% to 40%) when the team identity and team payoff was introduced while their relatively low performance was indicated.

The changes in the average performance according to the particular sessions were not significant. Thus, the theory that induction of the team identity and team payoff would increase the performance could not be confirmed.

### ***Limitations of the study***

There are important limitations in this study that need to be addressed. Firstly, as the sessions consisted of 20 (24 for the control session) participants the detailed statistical analysis of all questioned parameters and their comparison among sessions could not have been carried out. Thus, more observations are needed to bring additional insights.

Secondly, from the design of the treatment\_info\_team session it is not possible to clearly state all of the factors causing the increase in willingness to compete of the participating women as well as the decline in entering competition among the participating men. Therefore, more tasks should be included to test whether the shift was caused by positive (intention of women to bring more earnings for the team), negative (“free-riding” tendency; for more about free-riding tendency see [2]) or others. Moreover, it is necessary to distinguish consequences of induction of the team identity from consequences observed due to induced team payoff.

## **4 Conclusion**

Differences in behavior of genders have been subject of economic research for many decades; however, some important questions remain unanswered and unexplained. This paper reports on an experiment designed to study whether group membership and team payoff increases competitiveness of women and how (taking into account the fact that previous research shows that women are less competitive than men) or whether the group membership and team payoff affects their performance (as opposed to willingness to compete) under competition.

Firstly, I replicated the experiment conducted by [16] and confirmed previously published conclusions that women are less willing to enter a competition when given a choice. Secondly, during another session, information regarding the average performance of similar subjects in this task was presented to participants to indicate them their relative performance. This treatment partially closed the gender gap in willingness to compete. This treatment positively affected mainly high-performing women while low-performing men were affected reversely. Finally, the gender gap in choosing the competitive payment scheme closed absolutely when the team identity was induced and emphasized during the experiment. In this session, all high-performing women chose to be paid according to the tournament while high performing men did not change their preferences and mostly chose the competitive payment scheme too.

More evidence is needed to assess whether these findings can be generalized. Therefore, this experiment should be considered as a first step towards deeper analysis of gender differences in motivation for entering the competition. Thus, next steps will lead to the replication of used treatment and to deeper analysis of reasons causing the changes in preferences (mainly of high-performing women and low-performing men) by employing other tasks.

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# The Dark Side of the General Data Protection Regulation

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## Abstract

The Regulation (EU) 2016/679 on the protection of personal data (GDPR) was enacted in 2016 and it will apply from 25th May 2018 in the entire EU. The GDPR is a product of an ambitious reform and represents a direct penetration of the EU law into the legal systems of the EU member states. The EU works on the enhancement of awareness about the GDPR and points out its bright side. However, the GDPR has as well its dark side, which will inevitably have a negative impact. It is relevant and useful to identify problematic, controversial and unclear rules and institutions mandatorily brought by the GDPR, and propose recommendations about how to reduce, or even avoid, their negative impacts. These theoretic analyses are projected to the Czech case study focusing on municipalities, which offers fresh primary data and allows a further refining of the proposed recommendations. The GDPR, like Charon, is at the crossing, the capacity and knowledge regarding its application is critical for operating in the EU in 2018. There is no time to procrastinate in getting ready to address its bright and, more importantly, its dark side.

*Keywords: Controller v. processor; Data protection officer; GDPR; Transparency*

JEL Classification: D82, K29, M15, O33

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## 1 Introduction

Within the framework of the ten year strategy Europe 2020, especially digital aspects and the technological potential of European economies [3] and its dynamics between old and new member states [4], the European Commission presented the Data Protection Reform Package. The EU is well aware that, although openness-oriented policies are to be associated with growth [12], human rights and freedoms deserve a serious consideration and protection vis-à-vis predatory, over liberal and advantage taking practices. An integral part of it was a proposal COM(2012)11 for a Regulation on the protection of individuals with regard to the processing of personal data and on the free movement of such data which focuses both on the data storing and analyzing as well as the portability of the data, including Internet portability realized via emails or e-address books [2]. This mandatory drive for the unification of rules on the processing of personal data in the EU and its key features induced a noticeable wave of reaction [1],[24],[31]. Nevertheless, in April 2016 the Regulation (EU) 2016/679 on the protection of personal data - General Data Protection Regulation (“GDPR”) was enacted with its taking effect planned already for May, 2018 (art.99 GDPR). The GDPR has a broad reach which affects both public and private subjects, imposes a significant set of duties and principles upon them and threatens them with sanctions. Two of the many controversial features of the GDPR are (i) its general non-clarity and ambiguity and (ii) the compulsory introduction of the data protection officer (“DPO”) (Art.37 et foll. GDPR). The municipalities have to understand the GDPR, make an audit of their setting and update it to make it compatible with the GDPR, and appoint and pay for a GDPR expert - the DPO, which will double check it and possibly report any discrepancy. The objective of this paper is threefold. First off, to rather theoretically analyze the clarity of the GDPR provisions, especially for data controllers and processors from the public administration sphere, and the issues linked to the search and appointment of DPOs (O1). Second, to rather practically, based on a micro case study, analyze whether municipalities are prepared for the GDPR (O2). Third, to suggest solutions of possibly identified challenges, namely to recommend what municipalities should do to address the dark side of the GDRP (O3). The authors take full advantage of this pioneering investigation, interview the competent Association and generally their hands-on experience.

Although Czech municipalities will be used for the case study and Czech field observations used, the conclusion linked to the legislative and secondary sources of a non-Czech origin is highly relevant for all subjects of the GDPR, regardless if whether Czechs or not.

## 2 Legislative and Literature Review

Focusing on O1, the legislative review rests on the overview of key provisions of the GDPR, while paying special attention to its general (lack of) clarity and to its special setting of the DPO. The GDPR clearly perceives the processing of the personal data of a natural (!) person as a fundamental right (Preamble (1) and Art.1 GDPR) and related to the Charter of the Fundamental Rights of the EU (“Charter”) and to the Treaty on the Functioning of the EU (“TFEU”). The GDPR is conceptually embedded in the EU “constitutional triangle”[17], while endorsing the concept of the single internal market [15]. The European Commission indicates the general endorsement of the GDPR by up to 90% of Europeans and presents a bright picture of the GDPR [9]. The GDPR expands the definition of “personal data” and of “processing” (Art.4) and extends its reach to processing both within and outside the EU (Art.3). The bright picture starts to become darker with the definition of key subjects of the GDPR, “controller” and “processor” (Art.4).

**Table 1. Controller and processor under the Art.4 GDPR (Source: Authors)**

Function	Definition	Comments
Controller	the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; ...	All municipalities are “controllers” under GDPR and thus have to comply with it
Processor	a natural or legal person, public authority, agency or body which processes personal data on behalf of the controller...	Municipalities can become processors.

The GDPR provides a lot of mandatory principles, general and specific duties and requirements, along with references to various codes and other rules. In addition to the lawfulness, the processing is conditioned by a clear consent or other well defined reasons (Art.6)

**Table 2. Principles relating to processing of personal data under the Art.5 GDPR (Source: Authors)**

Personal data shall be processed
(a) processed lawfully, fairly and in a transparent manner (lawfulness, fairness and transparency)
(b) collected for specified, explicit and legitimate purposes (purpose limitation)
(c) adequate, relevant and limited to what is necessary in relation to the purposes (data minimization)
(d) accurate and, where necessary, kept up to date (accuracy)
(e) kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data is processed (storage limitation)
(f) processed in a manner that ensures appropriate security of the personal data (integrity and confidentiality).
The controller shall be responsible for, and be able to demonstrate compliance with, all of them (accountability).

Neither the GDPR nor the European Commission nor other EU institutions or bodies provide explanations about the exact meaning of these principles. The created uncertainty is further magnified by the extent of the responsibilities of controllers. They include the responsibility of the controller which includes the implementation of appropriate technical and organizational measures to ensure and to be able to demonstrate that processing is performed in accordance with the GDPR, including adherence to approved codes of conduct (Art.24). Each controller shall maintain a record of processing activities under its responsibility, including the name and contact details of the controller and the data protection officer, etc. (Art. 30). The controller shall seek the advice of the DPO (Art. 35). The controller shall designate a DPO in any case where: (a) the processing is carried out by a public authority or body, except for courts acting in their judicial capacity; (b) the core activities of the controller or the processor consists of processing operations which, by virtue of their nature, their scope and/or their purposes, requires regular and systematic monitoring of data subjects on a large scale (Art.37).

Municipalities are not only a subject of the GDPR, but in addition must appoint their DPO – either their “own” or a “shared one”, either as their employee or as their free-lance outsourcer. The tasks of a DPO are broad and can work for, as well as against, the particular controller.

**Table 3. Tasks of the DPO under the Art.39 GDPR (Source: Authors)**

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The data protection officer shall have at least the following tasks:
(a) to inform and advise the controllers of their obligations pursuant to the GDPR and to other EU law provisions;
(b) to monitor compliance with the GDPR, with other Union or Member State data protection provisions...;
(c) to provide advice where requested as regards the data protection impact assessment and monitor;
(d) to cooperate with the supervisory authority;
(e) to act as the contact point for the supervisory authority on issues relating to processing.

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The GDPR explicitly provides remedies, liabilities and penalties for any GDPR breaches (Art.77), such as the right to compensation and liability (Art.82) and imposition of administrative fines of up to 10 000 000 EUR or up to 2% of the total worldwide annual turnover or even up to 20 000 000 EUR or up to 4 % of the worldwide annual turnover (Art.83).

The literature review regarding the general (un)clarity of the GDPR and the special issue of the DPO begins, similarly to the legislative review, with a re-confirmation of the EU commitment to the doctrine of the famous four freedoms of movement on the single internal market [8] in the 21<sup>st</sup> century e-context [16],[20] and the very broad reach of the GDPR [27]. This commitment mirrors the interaction of public administration, business, law and information systems/information technologies in our global society, which is full of contradictions [31], of confusion between historical truth and reality [6], and of increasingly more complex and dynamic organization settings and proceedings [23] where the ultimate value is the information [18]. Since the electronization and resulting administration, processing and transferring of data should not lead to abuses and not impair the smooth operation of the single internal market, the EU decided to go for a unified legal regime inspired by the development of data privacy legislation on both sides of the Atlantic since the 1960s [28]. The EU’s overly positive tenor is matched by the pragmatic voice of academia, which recognizes the anticipated benefit of law consistency in data protection in the entire EU [31],[32], but immediately adds that the GDPR poses new challenges in general [21],[25] as well as vis-à-vis special aspects [5],[7] to its subjects, including such public law entities as municipalities. It is suggested that they are not sufficiently aware about the exact demands of the GDPR, including the DPO, are not ready for it [28] and that the compliance will cost financially, as well as in time and effort, more than what is expected. It is illustrative to conduct and analyze a micro case study based on questionnaires completed by Czech municipalities (O1 and O2) and to imply new recommendations (O3).

### **3 Materials and Methods**

The GDPR is a reforming regulatory piece of the EU legislation with a direct imminent application which expands the understanding and regulation of the processing of data of natural persons, and not only in the EU. This unequivocally determines both the materials and methods to be employed in the context of the three objectives – the ambiguity of the GDPR and its demands (O1) along with the un-readiness of the ultimate addresses – Czech municipalities – for the GDPR and compliance with it (O2), and recommendations about how to address this dark side of the GDPR (O3). The materials and methods further reflect that this is a multi-disciplinary topic requiring a truly open minded, pragmatic and not always conventional approach. Therefore, materials from heterogeneous sources must be researched and analyzed, namely (i) primary fresh data, obtained by questionnaire-generated research performed within the framework of the Czech micro case study focusing on selected Czech municipalities and their perception of the GDPR supported by the informal interview with the Czech association of towns and villages (“Association”), (ii) secondary data generated especially by fresh (ideally from the

last two years) academic writings and (iii) direct legislative data – a direct citation and exploration of the text of the GDPR itself. This diversity of materials needs to be explored and assessed by a set of methods and leading the van should be Meta-Analysis [26] complemented by critical comments and Socratic questioning [1]. Since the topic has strong legal aspects, the research and analysis are more qualitative than quantitative, and includes deductive and inductive aspects of legal thinking [22], as legal theoretic orientation reflects legal science which is argumentative, not axiomatic [13]. However, the opposition between qualitative and quantitative data and methods should not be exaggerated, since the available resources allow for addressing many of the research questions and issues related to the GDPR by combining and contrasting them [26]. The drive for an objective and neutral assessment and profiling must occur on both levels, qualitative and quantitative, and the employment of conventional methodology is challenging and “mathematization” is not to be performed in a rigid manner [19].

The principal data novelty of this contribution consists in the pioneering investigation in the form of a questionnaire search performed vis-à-vis five Czech municipalities from central Bohemia. These five municipalities, homogenous as to their inhabitant types and heterogenous as to their resources, were interrogated based on a questionnaire including the following seven questions reflecting O1 and O2 and inducing ideas for assessment and improvements, i.e. for the ultimate recommendations for the GDPR compliance. In order to yield the most from this rather homogenous sample, the questionnaire included seven open questions targeting the awareness, preparation, realization of the GDPR compliance and its costs. In sum, these questions reflected the three objectives – how are you getting ready for the GDPR? (Q1), are you going to be ready in May 2018? (Q2), what expense do you expect? (Q3), how are you going to finance it? (Q4), do you understand your GDPR duties? (Q5), who will be your DPO? (Q6) and do you know how ready are other municipalities? (Q7).

**Table 4. Questionnaire –7 questions given to 5 interrogated municipalities (Source: Authors)**

Questions	
Q1	How are you getting ready for the GDPR – where are you right now with your compliance?
Q2	Are you going to be ready in May 2018, i.e. will you manage to become GDPR compliant by May 2018?
Q3	Do you have your GDPR financial calculations, i.e. what (initial) expense do you expect?
Q4	How are you going to finance the (initial) expense for the GDPR compliance?
Q5	Is the setting of your GDPR duties clear to you, i.e. do you understand your GDPR duties?
Q6	How will you resolve the DPO personnel issue, i.e. who will be your DPO (employee, free-lance, shared)?
Q7	Do you know how ready (far in their preparation) for the GDPR are other municipalities?

This legislative and secondary data is further explored via primary data generated by this original and pioneering investigation. The information is explored and the yielded knowledge and data are confronted in a holistic manner, while focusing on the Czech micro case study and recommendations implied by it, while considering also legislative and secondary sources.

#### 4 Results and Discussion

The above presented legislative and literature review reveals that the GDPR is a new piece of strict legislation [2] which is much wider than the well-known concept of personally identifiable information under US privacy law [5],[10] and will be interpreted based on the teleological approach, i.e. its meaning is far from being either insignificant or obvious [11]. The only certainties are that the GDPR brings many new requirements to a broad pool of subjects [7], including municipalities, and that any breach is to be strictly sanctioned from May of 2018. It is necessary that each (potential) subject, e.g. municipality, performs an audit, analyzes the current status quo and needed changes in order to comply with the GDPR and implements these changes. This will entail both initial expenses and efforts as well as ongoing expenses and efforts [14], see e.g. the payment and co-operation with the DPO [21]. To reveal more about the perspectives of ultimate addressees of these requirements and duties of the GDPR, a balanced

set of five Czech municipalities were interrogated. Three of them are parts of the capital, Prague, one of them is a village near Prague and one of them is a town near Prague.

**Table 5. Questionnaire - 5 interrogated municipalities from central Bohemia (Source: Authors)**

Municipality	Surface in km <sup>2</sup>	Revenues/Expenditures in thousand CZK	Employees
M1 – in Prague	5,53	139 060/976 485	395
M2 – in Prague	24,22	814 826/750 706	358
M3 – in Prague	9,79	451 889/ 554 541	258
M4 – village	2,18	1 845/ 1 845	6
M5 – town	3432	175 46/ 196 305	61

All municipalities provided detailed answers with comments to all questions in (Table 6).

**Table 6. Questionnaire - Answers to 7 questions provided by 5 interrogated municipalities (Source: Authors)**

Quest.	M1	M2	M3	M4	M5
Q1 readiness	Employees' training, external audit	Employees' training, plans to order audit	Employees' training, external audit	So far nothing	Employees' training
Q2 timing	Hopes to manage	Hopes to manage	Believes to manage	Believes to..	Hopes to manage
Q3 expen.	No idea	Few millions CZK	No idea	No idea	No idea
Q4 financing	Extraordinary budget expense	Municipal budget	Municipal budget	Municipal budget	Municipal budget
Q5 clarity	Not really	Not really	Not at all	Not really	Needs exter. advice
Q6 DPO	Outsourcing, i.e. free-lance DPO	Dont know, wait for recommendation	New employee	Probably outsourcing	Probably outsourcing
Q7 others	Probably as we are	As we are, need for coordination	As we are, we exchange info	Has certain awareness	Info from the Association

These self-assessments reveal reduced awareness and problematic readiness. Additional comments and explanations provided by municipalities support it even further. The common tenor of the municipalities point out the dark side of the GDPR, or more precisely dark sides and paradoxes. Each municipality genuinely wants to be compliant with the GDPR, but no municipality truly understands what to do and what duties and requirements apply to it. Each municipality is ready to pay the necessary initial and even further costs, but no municipality knows roughly how much it will be. Each municipality plans on paying the expense from its budget, but does not have any special revenues or resources to offset it. This is a big issue, especially for municipalities with small budgets where “each CZK matters” and some of them even sadly stated that because of the GDPR no planned actions, investments and popular projects will be realized. The GDPR will take money desperately needed for critical municipal services. The DPO function is for all of them a clear stable and ongoing expense without bringing any noticeable benefit for the municipality. Some of them will hire an external (i) expert, either a law firm or other firm providing legal and data protection services, or (ii) create a new job and hire their own “DPO”. Although all municipalities have some awareness about the (un)readiness and struggles of other municipalities, they all would appreciate more information, ideally up-to-date. This call for information and advice is further magnified by the readiness of certain municipalities to use a public procurement call and select an outside expert firm and hire it for the GDRP audit and assistance for the setting of the initial GDPR compliance. These voices calling for guidelines and counselling are a true phenomenon and the Czech municipal association, i.e. Association granted an informal interview and within it stated that approximately 15 500 public service entities will have to comply with the GDPR (6 300 municipalities, 5 100 maternal schools, 4 100 elementary schools) and that the Association expects a “sharing” of the DPO, i.e. the Association thinks that approximately 20 entities will agree about hiring the same external, free-lance DPO. There is no hard data, this is mere speculation. Nonetheless, it is worth consideration, especially since the Association, in co-operation with human resource experts, came to a preliminary suggestion that each DPO will need to be paid approximately CZK 55 000

CZK brut per month, i.e. CZK 30 000 net per month. If this speculative prediction of the Association is met, then 775 DPOs are needed for the indicated public service entities and if each is going to “cost” CZK 55 000 per month, then the combined annual cost will reach  $775 * CZK 55 000 * 12 = CZK 515 500 000 CZ$ . The investigation of municipalities indicates (at least at this point) a much weaker readiness to “share” a DPO and suggests that many more than 775 DPOs will be needed. Recently, the authors have been contacted several times via group emails by head-hunters offering a DPO job, or at least a bonus for a recommendation for a law and data protection expert ready to take a DPO job. The authors saw several offers to attend DPO and/or GDPR training for approximately CZK 10 000 per day. The GDPR, awareness about it, and the DPO function, have become an integral part of business in the EU.

## 5 Conclusion

The GDPR and the implementation of its requirements is neither obvious nor easy nor cheap [7],[11],[14],[27]. The performed case study, along with questionnaires, informal interviews and field observations, provides a rather grim picture. First, Czech municipalities have a low awareness about the exact content of the GDPR regime, and this even despite their efforts, and struggle with several features, such as the DPO. Second, these municipalities are not yet prepared for the GDPR and even do not know how they could be. However, they all pragmatically came to the same conclusion as already partially presented in the foreign academic press, i.e. that the compliance with the GDPR demands substantial financial and human resources, training of employees and guidance [28]. Hence, some of them have already allocated resources in their budgets for future years for “GDPR”. From an accounting point of view, the GDPR is a clear expense for municipalities which often financially struggle and desperately attempt to have a balanced, and not a deficit budget. This prompts conclusions about the dark side of the GDPR and the perception of the GDPR as another bureaucratic, red-tape and expensive instrument from above [17],[19]. Well, the GDPR might have very bright aspects, especially from the above and long-term perspectives, and become a great opportunity [30],[31] and a leverage for the smart, sustainable and inclusive growth so vigorously called for by Europe 2020. However, many of its subjects, such as controllers and processors from the public sphere, perceive, and will perceive, its dark side [29]. The compliance with something unclear, complex and demanding is expensive and, at the same time, there is not enough time remaining and the price for non compliance is harsh, strict and heavy. These subjects, including Czech municipalities, understand that they have to “bite the bullet” and, in addition to financial resources, make other efforts. As already suggested, timely preparation is absolutely pivotal with respect to the GDPR [14],[24],[27]. Recommendations can be presented in this deplorable context. First, the EU should listen to bottom-up voices, provide a clear guidance [15], [23], e.g. via an Internet platform with clear advice in all languages of the EU member states [16],[20], and offer a leniency period and support. Second, each EU member state should engage in an open dialogue with subjects of the GDPR, provide resources (financial, informational, educational and other) to help them to reach compliance as soon as possible and send feedback and suggestions even to the EU. Third, Associations and other institutes should pool resources, and, via their www pages or other Internet platforms, offer conventional as well as on-line tutoring and advising [27]. Next, the public service entities would definitely benefit by a public procurement and central “sharing” of DPOs, perhaps based on annual renewal contracts allowing cancelling this type of service when these entities feel ready to perform “DPO in house”. Lastly, each subject of the GDPR should genuinely work on increasing its awareness and information sharing with other subjects and implement the acquired knowledge in order to boost the GDPR compliance without any delay. The EU and EU member states should appreciate it and include it in their leniency programs. Europe 2020 and the GDPR should be here to serve and help Europeans, not to punish them by bureaucratic demands! After all, the EU wants to increase its legitimacy and for this it needs smart and light (and not) dark sides of the GDPR!

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# Effectiveness of Administrative Services in Czech Republic

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## Abstract

Countries of Central and Eastern Europe the Czech Republic not excluded face the question of how to deal with the fragmented system of public administration. The Czech Republic has ranked on the top among the EU countries in the number of local self-governments per 100 thousand inhabitants. The question, that has to be risen is whether such a number of local governments is indispensable to ensuring the production and availability of administrative services, or whether it is merely a historical relict, which ultimately leads in many small communes instead of their development to an unavoidable "management of scarcity". Process of municipalisation could increase the efficiency of the system of local governments by maximally 6.17%, which would release funds of 12.08 bil. CZK. But would these mergers bring better (more effective) administration and public services?

The aim of this paper is to analyse the effectiveness of Czech local government system with focus on the size and type of administrative units and propose changes leading to the increase of effectiveness and improvement of administrative services and public services delivery using DEA and regression models.

*Keywords: effectiveness; DEA; public administration; administrative structure*

JEL Classification: H11, H70

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## 1 Introduction

Hendrych [11] says, that "the basic task of this science (administrative science) is to ensure the rational organization of the administrative apparatus with the most effective resources, forms and methods of its work, which make it possible to achieve maximum results with minimal effort and resources". While in the countries like Denmark, the Netherlands, Finland or Germany, territorial government reform (territorial consolidation) has been underway or is underway, the CEECs are still postponing the decision on territorial consolidation. The reasons and arguments used in these countries are summarized and explained by Swianiewicz [21, 22]. Thus, the effectiveness of the public administration depends on the structure of the administration system.

We take into account works examining the effectiveness of public administration more as the ability of a particular element to behave effectively (eg. Bouckaert, Haligen [3] or Osborne, Randor, Nasi [19]) or authors dealing with performance measurement (Julnes, Holzer [13]; Berman, Wang [2]).

In our work, we do not look closely at efficiency at the level of individual municipalities in areas such as public procurement or even economies of scale occurring in the provision or production of public services and goods in bigger quantities (Nemec, Meričková Mikušová, Vozárová [18]). We try to take a closer look on the structure of the administration system and see the effectiveness of the system as a result of its design – size of administration districts and scope of provided services – realised competencies. To deal with this issue, we decided to use the DEA what allows us a precise measurement of effectiveness.

Advantage of DEA over other methods is that it can handle multiple inputs and outputs. They do not even have to be in the same units. This feature appears to be crucial for public sector effectiveness examination. The basic problem of examining effectiveness within the public sector is the quantification of the value of outputs of public administration or the public sector. DEA was used for the measurement of public sector efficiency, for example by Moore [17], Afonso and Fernandes [1], Xueqian and Wei [25], and DeWitte and Moesen [7]. Authors like Moore [17], Pina and Torres [20] or Guerrini, Romano and Campedelli [9] have been able to

accurately describe and quantify outputs while they have examined the effectiveness of public service provision.

A structural reform of the local administration system in the Czech Republic could release funds up to 12.08 bil. CZK (446,99 mil €) [5]. But do larger municipalities in the Czech Republic really behave more effective? And are larger and hierarchic higher towns and cities more effective than smaller and hierarchically lower ones? These are the questions we would like to answer with our paper.

## 2 Material and Methods

The paper follows nowadays standard two-stage approach in evaluating DEA technical efficiency and its external determinants. In the first stage, DEA efficiency scores for Czech municipalities are calculated based on internal inputs and outputs. In the second stage these scores are then regressed on external variables which might drive the efficiency scores but cannot be treated as inputs or outputs per se. The aim of the second stage phase is to uncover potential impact of external/environmental variables on DEA calculated scores. The consensus on what type of regression procedure should be used is not straightforward. The potential candidates are – simple OLS regression (with or without robust standard errors), Tobit censored regression with limits of zero and/or unity, Simar-Wilson truncated regression or some forms of maximum likelihood estimations [16]. Since our estimates for OLS, Tobit and Simar-Wilson procedures do not markedly differ we use Tobit and Simar-Wilson as our principal way to obtain headline results (for the further treatment of many possible ways how to deal with second stage regressions issues, one can follow McDonald [16]. or Hoff [12]). We assume that simple pragmatic Tobit approach and specially devised Simar-Wilson procedure provide sufficient inference on our efficiency data. Especially we include Simar-Wilson regression results as a remedy for Tobit shortcomings [23]. As for the second stage, we regress the DEA scores on the set of dummies describing a type of municipality or its size. This procedure should allow us to see whether some types of municipalities are more efficient than others and if there is a tendency for increasing returns to scale in terms of a size (given by number of inhabitants). Information obtained may serve as a valuable input for policy making and public finance reforms.

### 2.1 Data

Data on municipal expenditures comes from the Ministry of Finance of the Czech Republic, from the information portal Monitor, part of the *financial reports - territorial organizations*. Data on municipal expenditures is for year 2016, including *current* and *capital* expenditures. The setting of filtering conditions was as follows: type of territorial units - municipalities, consolidation of territorial units: yes, class of items: current and capital expenditures.

In spite of the possibilities of setting outputs, both according to the COFOG classification and the level of urban areas, it is not possible to download this data from the portal. We are therefore working on the level of individual municipalities (even in the case of multilevel municipal governments) and the conversion to COFOG was done through a transmission bridge used by the Czech Statistical Office.

In the COFOG class 01.1.1 were included paragraphs of the budget structure 6111 - the parliament, 6112 - the communal councils, 6113 - the regional councils, 6120 - the office of the president of the Czech Republic, 6145 - the government office, 6171 - the activities of local administration, 6172 - the activities of regional administration and 6174 – the activities of regional councils. Municipal expenditure is therefore the sum of the expenditures of the municipalities mentioned in these paragraphs.

The sample on commune spending includes all municipalities including the Capital City of Prague.

Data on contributions for execution of state competences (for the year 2016) comes from the Ministry of interior of the Czech Republic. To use the data, no additional transformation was necessary.

## 2.2 Methods

Our approach to effectiveness measurement is based on DEA. We have chosen an input oriented slack based model, and in view of previous experience [5], we assumed *variable returns to scale* (SBM\_I\_V). What were the other reasons for choosing this model? We have chosen the *input-oriented* model because of the nature of revenue and expenditure of the self-governments. Due to the nature of administrative services and the demand for them it is considered appropriate that the effectiveness of self-government should increase by reducing inputs - administration costs, such as increasing outputs - spending, which would cause raising taxes or debt. If spending on administrative expenditure is reduced, expenditure on other public services provided by the municipality will be automatically increased. The choice of *slack based model* is based on inappropriate changes between inputs and outputs [24]

To answer our questions, we have constructed 3 variations of the SMB\_I\_V DEA model.

*Model 1* helps us answer the question: *Are larger offices more effective than smaller ones?* As inputs were used the contributions for execution of state administration in separate categories (for every competence) and as outputs the population of administrative districts for every executed competence.

The model parameters are: *I1: contribution for basic competence; I2: contribution for registration office competence; I3: contribution for construction office competence; I4: contribution for assigned competences; I5: contribution extended competences; O1: administrative district for basic competence; O2: administrative district for registration office competence; O3: administrative district for construction office competence; O4: administrative district for assigned competences; O5: administrative district extended competences; Number of DMU: 6253 (Prague excluded);* the number of DMU is based on the number of local governments which received funding on execution of state administration [15].

*Model 2* helps us answer the question: *Are larger and hierarchically higher towns and cities more effective than smaller and hierarchically lower ones?* As inputs were used the contributions for execution of state administration in separate categories (for every competence) and spending on other public services (total COFOG spending – COFOG 01.1.1 spending; [5]). As outputs we have used the population of administrative districts for every executed competence and the population of the commune, town or city.

The model parameters are: *I1: contribution for basic competence; I2: contribution for registration office competence; I3: contribution for construction office competence; I4: contribution for assigned competences; I5: contribution extended competences; I6: other COFOG spending; O1: administrative district for basic competence; O2: administrative district for registration office competence; O3: administrative district for construction office competence; O4: administrative district for assigned competences; O5: administrative district extended competences; O6: DMU population; Number of DMU: 6217 (Prague excluded, sample size reduced due to database pairing problem).*

*Model 3* helps us answer the question: *Does the size affect the effectiveness across different types of communes?*

As input was used COFOG category 01.1.1 spending. As outputs we have used other COFOG spending (total COFOG spending – COFOG 01.1.1 spending) and the DMU population.

The model parameters are: *I1: COFOG 01.1.1 spending; O1: COFOG other services spending; O2: DMU population; Number of DMU: 6217 (same as in Model 2, Prague excluded, sample size reduced due to database pairing problem).*

Dummy variables for regressions were created for the size and type in structure as follows. *Type of commune dummies: 1: basic competence (4980 observations); 2: registration office competence (618 observation); 3: construction office competence (231 observations); 4: assigned competences (183 observations); 5: extended competences (205 observations).* Dummies

for size categories: 1: up to 250 inhabitants; 2: 251-500; 3: 501-1000; 4: 1001-2000; 5: 2001-3000; 6: 3001-4000; 7: 4001-5000; 8: 5001-10000; 9: 10001-20000; 10: 20001-50000; 11: 50001-100000 and 12: more than 100000 inhabitants.

### 3 Results and Discussion

#### 3.1 Two-stage approach in evaluating DEA technical efficiency

*Model 1 – Are larger offices more effective than smaller ones?*

With model 1, we wanted to proof if there are economies or diseconomies of scale while increasing the *scale of the office*. As we can see in Table 1 all variables are significant even on the confidence level of 99%. The effectiveness decreases with every *larger office*. Starting with basic competences (dummy\_zaklad; used as baseline) to registration office (dummy\_matrika) -1 %, construction office (dummy\_stavebny) -1,3%, assigned competence (dummy\_povereny) -1,6% up to -9,2% by the extended competences (dummy\_orp).

Due to the regression results in Table 1, we can state that *there are diseconomies of scale* caused by the higher administration ineffectiveness *caused by a larger office*.

**Table 1. Model 1 – 2 using Tobit regression (Source: Authors)**

VARIABLES	(Model 1)	(Model 2)
	dea_objectivevalue	dea_objectivevalue
dummy_matrika	-0.00984*** (0.000605)	0.0419*** (0.00106)
dummy_stavebny	-0.0136*** (0.000948)	0.0629*** (0.00168)
dummy_povereny	-0.0164*** (0.00107)	0.0795*** (0.00189)
dummy_orp	-0.0917*** (0.00100)	0.105*** (0.00182)
Constant	1.005*** (0.000233)	0.856*** (0.000354)
Observations	6,253	6,217

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Model 2 – Are larger and hierarchically higher towns and cities more effective than smaller and hierarchically lower ones?*

In this case, we have extended the previous model by 1 input and 1 output so that we could “measure” the general effectiveness of the DMU – communes, towns and cities. The regression results are in Table 1, column 2. Again, as in previous case all variables are significant also on the confidence level of 99%. We can see that the effectiveness increases with every larger and higher position. Starting with basic competences (dummy\_zaklad; used as baseline) to registration office (dummy\_matrika) 4,2%, construction office (dummy\_stavebny) 6,3%, assigned competence (dummy\_povereny) 7,9% up to 10,5% by the towns and cities with extended competences (dummy\_orp).

Due to the regression results in the column 2, we can state that *there are economies of scale* caused by the size of the commune, town or city *and its hierarchical position*.

*Model 3 – Does the size affect the effectiveness across different types of communes?*

In this case, we have used a simpler model based on spending and population. The Tobit regression results are in Table 2. As we can see, the results are quite similar. We have again in most cases achieved a relatively high significance also with on the confidence level of 99% (if the result is significant, then almost always on the level of 99%).

**Table 2. Model 3 Interactions; Tobit regression (Source: Authors)**

VARIABLES	(All non-zero interactions) Eff. score		
1.type#1.size_cat	-0.102* (0.0545)	3.type#6.size_cat	0.196*** (0.0188)
1.type#2.size_cat	-0.0439** (0.0188)	3.type#7.size_cat	0.268*** (0.0207)
1.type#3.size_cat	0.0260*** (0.00871)	3.type#8.size_cat	0.359*** (0.0146)
1.type#4.size_cat	0.157*** (0.00689)	3.type#9.size_cat	0.517*** (0.0488)
1.type#5.size_cat	0.313*** (0.0119)	4.type#3.size_cat	-0.0255 (0.0233)
1.type#6.size_cat	0.402*** (0.0211)	4.type#4.size_cat	0.0867*** (0.0142)
1.type#7.size_cat	0.506*** (0.0388)	4.type#5.size_cat	0.215*** (0.0130)
1.type#8.size_cat	0.556*** (0.109)	4.type#6.size_cat	0.300*** (0.0176)
2.type#5.size_cat	-0.0735 (0.109)	4.type#7.size_cat	0.390*** (0.0245)
2.type#6.size_cat	-0.0711 (0.0545)	4.type#8.size_cat	0.443*** (0.0282)
2.type#7.size_cat	0.0291 (0.0386)	4.type#9.size_cat	0.660*** (0.109)
2.type#8.size_cat	0.114*** (0.0134)	5b.type#2.size_cat	0.00137 (0.00377)
2.type#9.size_cat	0.227*** (0.0139)	5b.type#3.size_cat	0.0377*** (0.00405)
2.type#10.size_cat	0.352*** (0.0168)	5b.type#4.size_cat	0.160*** (0.00613)
2.type#11.size_cat	0.570*** (0.0296)	5b.type#5.size_cat	0.402*** (0.0189)
2.type#12.size_cat	0.824*** (0.0621)	5b.type#6.size_cat	0.514*** (0.0331)
3.type#3.size_cat	-0.0838 (0.0629)	5b.type#7.size_cat	0.581*** (0.109)
3.type#4.size_cat	0.0391 (0.0258)	Constant	0.220*** (0.00248)
3.type#5.size_cat	0.159*** (0.0178)	Observations	6,217

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The low significance in several cases can be caused by an inappropriate match of competences to a commune, town or city by the state. This is often caused by a political decision that has to secure the provision of this set of administrative services in this space.

In this case we can see, that the effectiveness increases with the size of the commune, town or city across different types of communes.

### 3.2 Cross check of Model 1 and Model 2 results by a different model (Model 3 alternative)

In this case, we have used the Model 3 DEA results to cross check the results of Model 1 and Model 2 results. To do so, we have used again the Tobit regression. As we can see in Table 4, the previous results have been confirmed. The effectiveness decreases with the scale of the office and increases with the size of the commune, town or city.

**Table 3. Model 3 alternative specification - Type and Size; Tobit regression (Source: Authors)**

VARIABLES	(Model 3 alternative) Eff. score		
1.type - matrika	-0.0155*** (0.00554)	6.size_cat	0.410*** (0.0123)
2.type - orp	-0.444*** (0.0178)	7.size_cat	0.479*** (0.0161)
3.type - pover	-0.188***	8.size_cat	0.553*** (0.0155)
		9.size_cat	0.675*** (0.0215)

	(0.0118)	10.size_cat	0.796***
4.type - stavb	-0.100***		(0.0245)
	(0.00921)	11.size_cat	1.014***
2.size_cat	0.000880		(0.0346)
	(0.00376)	12.size_cat	1.268***
3.size_cat	0.0391***		(0.0649)
	(0.00395)	Constant	0.220***
4.size_cat	0.169***		(0.00249)
	(0.00538)		
5.size_cat	0.338***	Observations	6,217
	(0.00920)		
		Standard errors in parentheses	
		*** p<0.01, ** p<0.05, * p<0.1	

Due to quite similar results of the Simar – Wilson tests, we refuse to publish them in this paper. In case of interest, please feel free to contact the authors.

#### 4 Discussion and Conclusion

Model with differentiated competences in state administration execution allows us to examine the effectiveness of providing the administrative services from multiple perspectives - in terms of size and complexity (ranging from simple competencies to complex ones).

This article does not take a detailed look on the effectiveness of administration in the field of self-government competencies but incorporates it in a more general view in models 2 and 3.

If we omit the fact that the observed units (municipalities and cities) do not have comparable data on the number of administrative acts and their nature, we still have a problem with the choice of outputs. Although we evaluate the same units - municipalities, with the same functions (assigned competencies), we cannot say exactly what public services they should produce in order to become effective. Should they invest more money in education or social services? Build a sewage treatment plant or renovate a road? We have solved this problem in previous work [4], where we concluded that although we cannot say which service, respectively, what range of service the municipality should produce we do know that the municipality should spend the most possible share of the budget for other services for the population (instead of the administrative services) to make the most of their spending. In our case, therefore, the set of all self-government outputs will be replaced by expenditure on providing them. These will be considered as the output of a particular self-government.

This approach has been used also in this paper to include the self-governmental part of local governments into the analysis. We can see it in using spending of municipalities on public services in the COFOG classification as inputs and outputs of model 2 and model 3 (I6: other COFOG spending in model 2; and I1: COFOG 01.1.1 spending and; O1: COFOG other services spending in model 3)

The results of our analysis indicate that size matters. In the case of administration offices, the effectiveness decreases with the size of the office. This is caused by the ineffectiveness of complex systems. In the case of the size of city the effectiveness grows with growing population – a larger city, with complex services is more effective than a small village with simple services.

These findings should be taken into account while designing administration districts and delegating competences. The decisions about size and number of competences should be based on a cost benefit analysis. These should take into account on one hand the costs caused by the ineffectiveness of a larger office or a smaller population (scale of the city) or scope (number of executed competences) and on the other hand the benefits of the economies of scope (a larger number of executed competences) economies of scale (with growing population) or a bigger effectiveness of a smaller office.

Increasing the effectiveness of the administration system brings the opportunity to produce more and better services for the citizens.

Future research on this topic using DEA will focus on a further development of the methodology, to be able to address the above-mentioned problems with self-government competences. The research on the issues based on results of the polynomial regressions should be focused on a closer investigation of the reasons of (in)effectiveness in each kind of

administration type. This research should be based on case studies of every type in and in different size and also (geographic) place. Finally, the CBA problem of the size and effectiveness should be taken under a closer investigation.

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# Similarity and Differences in the Project Life Cycle of the Czech National Bank

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## Abstract

The public sector and public finance interconnections and the ways and choices of the decision-making bodies of the partner bodies (state or municipalities) are represented by the public administration (state or local) merge into a mixed economy in the area of good practice, science and research, development and innovation. The authors of the paper agree fully with this idea of intentional outline and connection of theory of project management and the research in practice. They deal with the differences and differentiations in the life cycle of the IT project in the environment of the Czech National Bank. In describing the project, DMS pointed out that the CNB is guided by an internal regulation when implementing new IT projects, but the general rule relating to project activity is absent. The methodology uses primary and secondary data sources, analysis of written documents and internal regulations of the CNB using the method of observation, description, comparison and analysis of the data. The proposal for change and innovation in the Bank's structure when defining the project set out in Instruction No. 62 should consist in reorganizing a banking entity with an emphasis on extending it to project activity.

*Keywords: Public and financial sector; Czech National Bank; life cycle of the project; similarity and differences*

JEL Classification: 022

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## 1 Introduction

Project management can be understood as the application of knowledge, abilities, recommendations and experience to meet the requirements of the project goal. Authors [3] point to the fact that the project is based on the Anglo-Saxon concept of the word project which refers to the process of planning and managing large-scale operations. Rosenau (2007) further notes that there are four typical features of projects that, if they occur together, distinguish the project from other managerial activities. If we define the project features in more detailed way according to [9], with a three-dimensional goal, we identify the need to meet the project requirements according to the question of fact of the project in relation to quality, timing and budget costs. Successful project management requires to the fulfilment of these three objectives to be imperative [16], i.e. measurable, verifiable, unique, unique and achievable [2].

As stated by [4], the project has a defined start and end, and in the life cycle goes through the phases where the number of phases of the project as they say [15], [17], [22], e.g. conceptual, design, and implementation, may vary according to the details of the structure. The terminology of the life cycle phases of the project extends to the production phase, the operational phase and the project elimination phase.

The implementation phase of a project can be considered from the point of view of project management the project's most demanding stage of life cycle, consisting of a large number of real project activities, which amount and extent is influenced by the demands and complexity of overall assigned project [18]. The goal of the implementation phase of the project is to observe the planned stages of the project phase of life cycle of the project as a change that results from the use of project output and expert contribution in the field of project management, which after the end of the implementation phase of the life cycle of the project brought the result [20]. In terms of legal certainty come to the signature of the acceptance protocols, or rather processing the final project report, i.e. the concentration of the sum of experience from the implementation

phase of the project, including suggestions and recommendations to change or innovation of subsequent projects [1].

Even though project management is not a new field, as evidenced e.g. by the construction of ancient monuments or Egyptian pyramids and Roman aqueducts, a more comprehensive view of project management issues has emerged in technical literature up in the 20th century, particularly in connection with the introduction of so called Gantt diagrams called after pioneer of project management Henry Gantt, who used it as a tool for planning and managing shipbuilding. In the 1950s and 1960s in time of military and cosmic project were developed methods of the CPM (Critical Path Method), PERT (Program Evaluation and Review Technique) and PDM (Precedence Diagram Method) which are used in project management to date. The development of project management then penetrated into other sectors, arose associations that have gathered experience and collected knowledge, such as IPMA (International Project Management Association) and Project Management Institute (PMI). The world's leading standards include PMBoK, ICB, PRINCE2®, but also ISO 10006 and ISO 21500.

The authors of the presented paper agree with the idea of the cited author with the emphasis on the interconnection of the theoretical basis of project management with using in the application part. In the introductory part of the contribution from the CNB environment, authors [6] point to the fact that in banking sector are implemented only the continuous, regular operations and routine activities, such as the use of monetary policy instruments in the financial and banking market [11], the management of foreign exchange reserves, the control of banking entities in the financial market or other internal activities of the CNB, not activities that are managed and coordinated by the project, e.g. the introduction of a new IT program into the system [12].

The CNB uses a matrix organizational structure whose advantages compared to the functional (traditional) and project organizational structure lie in support a functional organization that allows the creation of project teams across the entire organization with the support of all stakeholders of the organization. The authors point to this situation, e.g. [13], [21], [10], with the fact that teams of individual organizational structures can quickly adapt to the new conditions and requirements of the environment. The disadvantage of the matrix organizational structure is the duplicity of superiority relationships influenced by the inconsistency and inconsistency of the key competencies of managing worker in terms of more demanding management, decision-making and accountability [5].

The Czech National Bank has expanded the scope of organizational units, e.g. papers, trade unions and special sections so called Ad hoc formations according to organizational structure similar to project teams which flexibly respond to new situations requiring mutual coordination [7], cooperation of project teams when entering and solving partial tasks and project themes across the range of organizational departments of the banking institution [14]. Organizational regulations of CNB newly formed project teams considered for prompt project management tools adapting to new requirements and entering, which permanent employees are within the service of personnel leasing lending to other units to solve key issues [17], potential risks and difficulties encountered in the banking sector. The scope of permanent employees when entering and solving specific tasks of the project was coordinated by the head of the project team in participation of leading organizational unit; under which cooperative worker perform dependent activity according to labour relations.

## **2 Material and Methods**

Relationships based on Pareto's rule, where the situation can not be improved by any of the stakeholders, without worsening the situation of another entity, intersect with the public sector and public finances.

The basic premise is the concept of lifecycle of the project published in the National Standard of Project Management Competence, which is the assessment of project management at the Czech National Bank, including the formulation of proposals and recommendations in

terms of improvement and innovation of the current state of project management with an emphasis on the life cycle in the banking sector of examined company. The methodology is designed in terms of the use of primary and secondary data sources, analysis of written documents and internal regulations of the Czech National Bank using the method of observation, description, comparison and analysis of the facts in the context of SMART rules. The introductory part of the paper defines the basic features of the project, the possibilities of its classification, the life cycle of the project and the individual phases of the project according to methodology by IPMA.

In the analytical part of the paper is used case study which is applied to the Czech banking sector. Based on the applicability of the projects in practice as a change that results from the use of project output and expert contribution in the field of project management, which brought the result, is a description of similarities and differences in the life cycle of the project, with an emphasis on advantages, opportunities, weaknesses, risks and pitfalls that have impact on the quality of the project life cycle. The proposal for change and innovation in the Bank's structure when defining the project set out in Instruction No. 62 should consist in reorganizing a banking entity with an emphasis on extending it to project activity.

### **3 Results and Discussion**

The DMS project or project for the implementation of the system management document was initiated at the CNB in December 2015 by the director of the division of the banking office by submitting a impuls to the submitted internal regulation, i.e. according to the CNB instruction No. 62 on the development of information systems and technologies in the Czech National Bank (hereinafter referred to as „Instruction No. 62“). The incentive can be described as a project intent, which was justify that there is currently no united information system within the CNB that would allow to search, share, process and store selected digital documents and then work with them to substitute completely or at least partially paper circulation of documents within the CNB and reduced the internal distribution of digital documents through electronic mail.

As stated in the initiative, some functionality related to the storage and sharing of selected types of digital documents is currently in CNB provided by technologically and functionally obsolete IS Obelisk database that no longer meets the higher user requirements for working with digital documents and their metadata with respect to the date of acquisition. The main objective of the project was the creation of an efficient system for storing and managing selected digital documents in order to ensure regular circulation and approval of documents within the CNB (workflow). The impuls has set the expected date for implementation, including claims on material, technological, financial and human resources.

In order to allow the implementation of this project, it was necessary to discuss and approve the proposed initiative by the CNB's Information Committee. The Committee was comprised of the director of the informatics section and the CNB's managing directors responsible for changes and innovations in the relevant IT projects. The presented DMS project fulfilled the project's features, i.e. it had a three-dimensional objective, it was unique, it included material, financial and human resources and at the same time it complied with the SMART rules according to the specification, measurability, acceptability, realization and term of the project and was therefore designed and approved by the CNB Information Committee. As a necessary written document, a so-called preliminary feasibility study was elaborated in co-operation with IT specialists, which contained a more detailed description of the solved issue, project benefits and risk analysis with regard to the data security of the new system, which possible migrations, technical requirements for the new information system, including possibilities connection with other information systems of CNB, such as a system of file service or an intranet network, a description of the solution variants, the justification of the recommended alternative, the timetable of the project and the budget, including the risks associated with the selection of the external contractor. Preliminary feasibility studies have not be prepared by the CNB solely for initiatives which subject is the repeated purchase of products/services of IS/IT or upgrading of a

system environment that does not have an undesirable impact on the CNB's operating information systems with respect to their security and the implementation of variant solutions.

The budget for the DMS project was set at CZK 8 million including VAT that the monetary amount only covering the costs of the external contractor of the technical solution, not the total cost of the project, such as the costs to wage of the project team members for the duration of the project implementation. Even if in CNB has not been prepared an opportunity study or a feasibility study according to description of project management by IPMA, according to the authors of the paper, the preliminary study of the DMS project allowed us to provide answers to the question whether can be possible or real planned project realize. In the record of the meeting of the Information Committee, in which the preliminary project feasibility study was approved, state the basic technical and organizational parameters of the project. The authors also state that in the CNB has not been yet submitted or approved a similar project plan with a breakdown of the work, an analysis of the project objectives focused on partial tasks or other requirements, the project team was first introduced, see Table 1, Timetable of the project of which project activity begins with the start of project implementation.

**Table 1 Timetable of DMS project (Source: Authors)**

TIMETABLE OF DMS PROJECTS	
Task	Time to complete the task
Processing a project impulse	31. 12. 2015
Approval of the project impulse	31. 1. 2016
Processing of the preliminary study of the project	29. 2. 2016
Approval of the preliminary study of the project and establishment of the project team	31. 3. 2016
Start of project implementation	30. 4. 2016
Processing of entry documentation	30. 6. 2016
Selection procedure and conclude a contract	31. 12. 2016
Processing of the implementation study	31. 3. 2017
Approval of the implementation study	30. 4. 2017
<b>Implementation of DMS</b>	
Basic functionality of the system	30. 6. 2017
Workflow for working with documents	31. 8. 2017
Migration of data from IS Obelisk	31. 10. 2017
Termination of operation verification	31. 1. 2018
Transmission of DMS system into routine operation and project termination	28. 2. 2018
Evaluation of project implementation	30. 9. 2018

By approval of the preliminary feasibility study of the project was checked a project manager from the IT department who had experience with the implementation of IT projects. The deputy to the project manager has been appointed another worker from the same section, who will be the technical administrator of the project after the completion of the project. The members of the project teams included representatives of procedural document management, members of the office circulating and archiving office in Obelisk, an employee of the legal section and legislation and a member of the administrative section responsible for selecting an external contractor for the delivery of the technical solution.

After the completion of the pre-project phase of the project plan, planning the implementation of the project in the form of a preliminary feasibility study, its control and approval by the IT Committee, the implementation phase of the project was proceeded. The start of the implementation of the project was dependent on the date of the decision of the project manager, which was limited by the time schedule of the individual project phases according to the character and scope of the project. The first working meeting of the project team, i.e. kick-off meeting was implemented by Instruction No. 62 to introduce the project team, defining the rules of internal communication among project team members and external communication with the supplier of the technical solution of the project through email correspondence and personal meetings as needed and the urgency of work assignments and written requirements, usually on a Wednesday, from 14 o'clock at the parent company's branch. After completing the individual tasks according to the rules for the reporting of the partial results of the project (milestones) listed in the timetable, the IT Committee agreed that the individual project results will always be reported by the project manager to the individual members of the project team. The partial task of the project team was to prepare the entry documentation for the external contractor, including a detailed description of the functional requirements of the system and the individual workflows for the circulation of written documents. After it was announced selection procedure and an external contractor was selected to conclude an IT solution delivery contract. In addition, implementation study was developed which defined the way of defining the functional requirements of the system and the circulation of written documents, such as the process of data input and commenting, approval of draft solutions and archiving of individual documents. From the point of view of the implementation of the DMS project, it was necessary to define and put into operation on the CNB's IT servers the basic functionality of the system in compatibility with the individual types of written documents for the purpose of their preliminary classification into individual components and the progressive commenting, approval of written documents.

During the implementation of the DMS project, it was monitored whether the project is running according to the timetable and in the context of the preliminary feasibility study supported by the project manager's report and the explicit approval of the Information Commission, which approves the documents. For the sake of completeness, the authors of the paper state that the CNB also has other control mechanisms, such as physical control (asset inventory) or document control, which can (for now it was not) be independently audited by the Internal Audit Department responsible for internal control of processes at the CNB. In case of identifying the analyzed and previously unrecognized risks, it is necessary to solve them at the level of the project team, but also with the Information Committee, in order to take possible measures for their elimination or complete elimination.

The DMS project is in the implementation phase before finalizing the implementation of the technical solutions on which will start up test operation of the system tested by the individual members of the project team. Then, it is possible to assess whether the system meets the defined objective and meets expectations and requirements in terms of clarity, intelligibility and safety or other potential risks. In the case that the DMS system passes through a verification (testing) operation (Instruction No. 62 refers in this connection to testing that has to verify whether the product meets the requirements for functionality, reliability, performance and compatibility with the CNB system environment), it will be possible run it in normal operation in the CNB environment and terminate the project. Based on the activation of the project to the operation it will vy vy, the project manager draw up a Protocol on the transfer of the system to the material and technical administration, which will be provided on the operational side by the Information Committee with a preliminary implementation date from February 2018. In the after project phase deal with assessment of the project, the project will be implemented by the Department of Internal audit. An external contractor will be financially remunerated; this contractor is rewarded by the method of advance payments once the task is assigned. Doplacení souhrnné ceny za odvedené pracovní úkony bude realizováno po předání systému DMS do provozu nebo při předání projektové dokumentace k archivaci. The project team will cease its activities not by introducing the system into normal operation but by elaborating the final report of the project, which, according to Instruction No. 62, will be prepared by the project manager in

cooperation with other project team members. The final project report will include a recapitulation of the project life cycle, planned and realistic start and end of the project, planned and real project costs, project evaluation and cooperation with an external subcontractor, as well as an update of the security profile of the information system implemented in the security measures and approved residual risks. Pursuant to Instruction No. 62, the final report is not required just for projects that provide repeated getting of products/services IS/IT. Reporting will include proposals and recommendations for future projects at the CNB, focusing on the benefits, opportunities, weaknesses, risks and pitfalls in relation to the quality of life cycle of the project.

#### **4 Conclusion**

Public sector involvement in commercial banking as a competitive attribute for selected products and services strengthens the significant position and strategic position of the public sector in the financial sector in private banking in the portfolio of banking products and services, but also state ownership interests, including the concept of the development of key companies such as Czech Railways, CEZ, Czech Post. Consideration can also be given to the possibility of setting up new enterprises with a majority share of the state or regions in selected areas of the local economy in the municipalities. To this end, the public economic reconstruction fund is offered for strategic state investments, ie the founding activities of the state or the purchase of equity interests in strategic areas.

The authors deal with the differences and differentiations in the life cycle of the IT project in the environment of the Czech National Bank. In describing the project, DMS pointed out that the CNB is guided by an internal regulation when implementing new IT projects, but the general rule relating to project activity is absent. The proposal for change and innovation in the Bank's structure when defining the project set out in Instruction No. 62 should consist in reorganizing a banking entity with an emphasis on extending it to project activity.

At the pre-project phase of the DMS project, there was pointed to a need to elaborate and approve a project plan and a preliminary study. Contrary to the theoretical description of project management according to IPMA, an opportunity study or a feasibility study has not been prepared, however the basic features of the feasibility study were fulfilled. Authors of this contribution see inconsistency in the absence of a more detailed project plan with a breakdown of individual works, decomposition of the project objectives by the WBS (Work Breakdown Structure) method into general and partial tasks. WBS is a simple analytical method designed to divide the project into individual activities up to such a level of detail that it is possible to assign responsibilities, labour-intensity and time horizons. The structure of activities can be according to complexity and scale of the project diversily structured and complex - for small projects it can take the form of a simple list of activities, for a very complex project it can create a multi-level structure of clustered activities into complex blocks or packages so that the final activities list (activities, steps) as clear as possible. WBS is used to fulfilment of activities in the Gantt diagram when planning a project and is usually handled by the project manager before the project is started.

The project phase itself of DMS project, according to author's opinion is not fundamentally different from project management according to IPMA. It started with a kick-off meeting, where internal and external communication rules were set up between the members of the project team, including rules for reporting partial project results and carrying out continuous project control. To realization of project activity itself it is appropriate to initiate work meeting of project team members at regular intervals and clearly assign tasks so as to avoid delays in realization activity of project.

In the after project phase dealing with evaluation of the project, project will be implemented by the Internal Audit Department. In summary, the life cycle of the project in implementing the DMS project in the Czech National Bank environment is in many respects consistent with the life cycle according to IPMA, the authors of the paper believe that the authors

of Instruction No. 62 with the IPMA methodology were inspired. At the same time, they point to the fact that the consensus is not complete but presented in a simplified form; therefore, they recommend, in particular in the pre-project phase of the project with an emphasis on the clearer adherence to the IPMA methodology including the elaboration of a more detailed project plan, budget costs and possible risk analysis. Due to the timetable of the DMS project in the CNB, it is not possible to predict the successful completion of the project, but we believe that it would be desirable to use the project management benefits in bigger extent with an emphasis on the pre-project phase, including the acceptance of an internal rule that solves other types of projects than IT projects because these may be needed and necessary for the future. If in CNB come to the project management develop, as stated by [1], it would be appropriate to submit a new proposal to change and implementation of innovative conditions for the involvement of individual CNB staff in the project team, to increase their work motivation and interest in the project activity with a view to successfully completing the implementation phase of the project. We believe that the project can be more successful, the more the members of the project team are convinced of the need and necessity of achieving the set objective in relation to the quality of the project life cycle.

Authors further believe that it would be appropriate to develop a SWOT analysis in more detail, including predictable and unpredictable risks, limitations, discrepancies that might occur during the implementation of the project. Also, with a view to costing, it is also appropriate to develop a more detailed budget proposal, including the cost of the external contractor's selection procedure, including the wage costs of individual project team members. Last but not least, the authors also point to the absence of the foundation document of project, which is replaced by the minutes of the meeting of Information Committee.

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# Subjective Risk Perception When Armed Soldier is Present in City Centre

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## Abstract

This study analyses the impact of presence of armed soldiers on the subjective risk perception of terrorism, pick-pocket robbery, loss of luggage at the airport, heart-attack and lightning strike. The research was conducted on the sample of 265 respondents from the Czech Republic during November and December 2017, who were split in three scenarios during electronic questioning. In first scenario picture of Paris with an armed soldier was presented during questioning on subjective risk perceptions. In second scenario picture of Paris without an armed soldier was presented during questioning on subjective risk perceptions. The third group was the so called control group presented with no picture during the electronic questioning. The result of this study is the comparison of data from these three scenarios for subjective risk perception of terrorism, pick-pocket robbery, and loss of luggage at the airport, heart-attack and lightning strike. First data imply that the presence of armed soldiers can have a positive effect on crime-related subjective risk perception, but negative effect on other non-crime related subjective risk-perceptions.

*Keywords: crime; terrorism; subjective risk perception; priming; security measures*

JEL Classification: D81, L83

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## 1 Introduction

Crime is a natural part of human society despite many efforts for its control; it always finds a way for its existence. The worse the crime is the more anxious it makes the local population as well as tourists. [4], [5]

In the last ten years, there are growing numbers of troops with machine guns serving on streets of European cities. We can see them around government buildings, major transport hubs, synagogues, galleries and stadiums. They are present in Western Europe, which has recently become the target of several Islamist terrorist attacks, as well as in Eastern Europe, where a similar attack has never occurred (nevertheless the anxieties about attacks from Islamic extremists are also in Eastern Europe running high). As the main purpose of armed soldier's presence in European cities authorities declare the prevention of terrorist attacks and psychological support for tourists and domestic population. Army deployment in European cities initially intended as an emergency measure is now becoming the new normal, justified with each new attack. The cost of the overall presence of the armed forces and its real contribution to calming the nerves of European citizens are questioned only rarely. [1], [2]

The theory, which explain how threat influences human behaviour is the protection motivation theory. [3] Protection motivation theory was created to clarify fear appeals and predicts when and how individuals respond to threats. According to protection motivation theory people protect themselves based on four factors: perceived severity of a threatening event, perceived probability of the occurrence, or vulnerability, efficacy of the recommended preventive behaviour, and perceived self-efficacy. [8] Protection motivation stems from the threat appraisal as well as the coping appraisal. The threat appraisal process consists of both the severity and vulnerability of situation. It focuses on the source of the threat and factors that increase or decrease likelihood of maladaptive behaviours. The coping appraisal consists of the response efficacy, self-efficacy, and the response costs. Response efficacy is the effectiveness of the recommended behaviour in removing or preventing possible harm. [7] Previous studies have showed that adaptive behaviours are prompted to the extent that a health threat is

perceived to be serious. The magnitude of threat appraisal is dependent on the probability of an aversive outcome, and the severity of the outcome should it occur, and adaptive avoidance behaviours are likely when both are judged as severe. protection motivation theory can be extended to the context of consumers' response to terrorism. Initially, it may seem intuitive that people would engage in avoidance behaviours when concerns with terrorism are strong. Nevertheless, based on PMT, it is suggested that consumers' responses may be more nuanced. [3]

The main objective of the following study is to find out whether the deployment of armed soldiers in in the city of Paris influences the subjective risk perception of terrorism, pick-pocket robbery, loss of luggage, heart-attack and a lightning strike and how do the reaction of Czech population differ when armed soldier is present and when armed soldier is absent.

## 2 Material and Methods

To find out the impact of the above mentioned public policy we can use the approach of behavioral economics. [4] Our goal is to get to answer the question if armed guards serve as a psychological support for calming nerves of tourists or rather a stress factor we have decided to choose a city, where soldiers with machine guns appear more and more frequently and which is also popular among Czech tourists – Paris. After choosing the destination, we decided to use the electronic version of questionnaire, which makes is possible to randomly split respondents into three groups. Every member of every group was asked the same question during the process of electronic questioning: *“You have received a birthday voucher to visit Paris this Christmas. Please rate on scale 0 (no worries) 1 (almost zero fear) 2 (little worry) 3 (medium worry) 4 (a great concern) 5 (very scary fear) to what extent you fear a terrorist attack, pick-pocket robbery, loss of luggage, heart-attack and lightning strike.”*

The only difference between these three groups of respondents is the fact that when answering to the above cited questions, first group (n = 82) of respondents was presented with a picture of Paris without armed soldiers (pic. 1), the second group of respondents (n = 82) was presented with the same picture of Paris, with the difference there is also one soldier holding a gun on the picture (pic. 2) The third group (n = 101) was the control group and was presented with no picture during the electronic questioning. To compare these three scenarios (presentation of picture without the presence of armed soldier, presentation of picture with the presence of armed soldier and control group with no picture at all) we decided to calculated means of respondent's Likert scale answers and then use the ANOVA testing to find out if there is statistical significant difference between risk perception in these three scenarios (when armed soldier is present, when armed soldier is absent and the control group). If there will be statistical difference, we can say that soldiers have an impact on subjective risk perception. If the values of risk perception in Group 1 (soldier is absent) will be higher than in Group 2 (soldier is present), we can speak about a positive effect of presence of soldiers in city of Paris on subjective risk perception. If the values of risk perception in Group 1 (soldier is absent) will be lower than in Group 2 (soldier is present), we can speak about negative effect of presence of soldiers in city of Paris on subjective risk perception.

The data were collected in Czech language among citizens of the Czech Republic in winter 2017 (mid-November and December 2017). Regarding the structure of respondents, the majority of participants of our survey was aged between 19 and 30 years (54,73 %) and only 7 % of respondents was 51 years or older. The total 68,36 % of participants of this research were females. And because of the relatively young average age of respondents, 78, 52 % of participants of the research indicated that they do not have any children. The structure of respondents is not representatively corresponded with the structure of Czech population.

**Figure 1. Picture presented to group 1 - no soldier is present (Source: Edited picture from Guardian)**



**Figure 2. Picture presented to group 2 - soldier is present (Source: Guardian)**



### **3 Results**

The results show that the control group (presented with no picture during the electronic questioning) has indicated the least fear of a terrorist attack (mean = 1, 91). Group presented with no soldier on the picture (group 1) have indicated higher fear of terrorism (mean = 2, 5) than group presented with soldier on the picture (group 2) (mean = 2, 09). Also, in case of pick-pocket robbery we can see that the risk perception of this kind of crime slightly decreases when armed soldier present on the picture.

On the other hand, when stating the subjective risk perception of non-crime-related insecurities like loss of luggage, heart-attack or lightning strike respondents had the tendency to state higher points on the Likert scale when soldier was present on the picture than in case they were presented with a picture with no soldier or with no picture at all.

**Table 1. Subjective risk perception on Likert scale (Source: Author)**

<b>Risk</b>	<b>Group 1- soldier is absent</b>	<b>Group 2 – soldier is present</b>	<b>Control Group</b>
Terrorism	2,5	2,09	1,91
Pick-pocket robbery	1,7	1,66	1,77
Loss of luggage	1,66	1,71	1,51
Heart-attack	0,5	0,84	0,54
Lightning strike	0,37	0,41	0,34

**Table 2. ANOVA test for finding statistical significant difference between Group 1, Group 2 and Control Group (Source: Author, with the use of www.socscistatistics.com)**

<b>Summary of Data</b>						
	<b>Treatments</b>					<b>Total</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
<b>N</b>	10	10	10			30
<b>ΣX</b>	124	275	310			709
<b>Mean</b>	12.4	27.5	31			23.6333
<b>ΣX<sup>2</sup></b>	5830	18221	20886			44937
<b>Std.Dev.</b>	21.8388	34.4133	35.3962			31.173
<b>Result Details</b>						
<b>Source</b>	<b>SS</b>	<b>df</b>	<b>MS</b>			
<b>Between-treatments</b>	1954.0667	2	977.0333	F = 1.00583		
<b>Within-treatments</b>	26226.9	27	971.3667			
<b>Total</b>	28180.9667	29				

When running ANOVA test to find out if there is a significant difference in responses for these three scenarios (Group 1, Group 2 and the control group), we found out that the presented values differ only in little and are not statistically significant. Precisely The f-ratio value is 1,00583. The p-value is 0,379035. And therefore, the result is not significant at  $p < 0,05$ .

#### 4 Discussion and conclusion

The presence of armed soldiers could have an influence on subjective risk perception. First results imply that when armed soldier is present the overall risk-perception of terrorism or other crime decreases. On the other hand, when armed soldier is present the other types of risk not connected with crime – like loss of luggage and heart-attack or lightning strike, are perceived as bigger compared to the situation when armed soldier is not presented.

In any case it is important to point out that this research was carried out exclusively among Czech respondents (in Czech language) and therefore it is possible that if this research was reproduced in a different country/culture, the results could vary significantly. Also, it is relevant to mention there was no terrorist attack in Paris, France or other European country during the period of electronic questioning and the results of this study could be different shortly after a terrorist attack when emotions in the society are running high. Last but not least, only 265 respondents have participated in this research making it rather an initial mapping of this issue than a detailed analysis. Also, the participants of the research do not correspond with the demographic structure of Czech society, young respondents were overrepresented and older respondents were underrepresented in the research.

Because of the small sample we have not reached statistical significance between subjective risk perception, which occurs in three scenarios (with and without armed guard and the control group). On the other hand, the first data about this topic show that the presence of armed soldier in streets of Paris could have a positive influence on risk perception of terrorism and pick-pocket robbery and at the same time a negative influence on crime non-related risks.

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# Intellectual Capital as a Factor Shaping the Competitiveness of Regions in Poland

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## Abstract

The globalization process has increased an interest and drew the attention of many practitioners and researchers to the role of intellectual capital in creating and achieving competitive advantage in the marketplace. In an environment of growing competition, only regions oriented on continuous improvement of its competitiveness, through the appropriate management of their intellectual capital, have an opportunity for further development.

Therefore, the aim of this paper is to analyze the impact of intellectual capital on the competitiveness of regions in Poland. The article deals with both theoretical and empirical issues. In the first part of the article, the characteristics of intellectual capital were described. In the second part, the statistical data was analyzed and a panel model estimated by the least squares method was constructed. For the calculations 'GRETL' software was used.

*Keywords: intellectual capital; competitiveness; regions in Poland*

JEL Classification: C19, J24, O15

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## 1 Introduction

The place of man in economic processes is the subject of considerations of many authors. However, they often expressed loose thoughts, which over time evolved and as a result became the basis for the creation of a new research area, important from the point of view of economic development which the intellectual capital is.

Human resources are the basis for the functioning of every organization, state, and region. The quality of the human factor, that is, its skills, knowledge, or competencies, can contribute to the attainment, or on the contrary, the loss of a favorable competitive advantage in the market. Currently, the factor that is increasingly important in achieving competitiveness is the ability to use intangible assets, or intellectual capital.

Regional development is perceived as a systematic improvement in the competitiveness of economic entities and the standard of living of inhabitants, as well as an increase in the economic potential of regions, contributing to the country's development. Many scientists prove the dependence of the connection of material resources with the economic development of a region. When it occurs, we can talk about regional development in the category of resources. However, after exceeding a certain level, further development is directed only through intellectual resources. They have a major impact on the competitiveness of regions.

Therefore, this publication is an attempt to partially fill the gap in research on the concept of intellectual capital. The main purpose of the work is to present the author's concept of measuring intellectual capital and its application to the measurement of intellectual capital of Polish voivodships.

### 1.1 Characteristics of intellectual capital

There are many definitions of intellectual capital in the literature on the subject, but none of them has been recognized as proper and therefore universally accepted [4]. A large number of concepts is associated with the first period of interest in "invisible assets" (from the early 1980s to the mid-1990s), when the issue was so new that theoretical considerations at that time focused mainly, and often only, on the attempt to identify and define the intellectual capital [15].

The richness of the intellectual capital definitions also partly results from the fact that the impulse for the need to look at the intangible assets in other way came from business practice and only theoretical justifications and views explaining and describing the essence of the concept were sought [6].

Intellectual capital is the category of capital that refers to the recognition of knowledge as a resource and a factor of production. It should be emphasized that in the literature devoted to intellectual capital there are many ambiguities related to the definition, identification of concepts, and methods of measurement [14].

As it was mentioned earlier, intellectual capital has not yet been fully understood and described [3]. Therefore, there is a great need to undertake scientific research in this area. Currently, we can meet with many interpretations of this concept. Selected definitions of intellectual capital of the company and region are presented in Tables 1 and 2.

**Table 1. Intellectual capital of the company (Source: Wosiek)**

Author	Definitions of intellectual capital of the company
T.A. Stewart (1991)	Intellectual material, knowledge, information, intellectual property, and experience that can be used to create wealth. It is the sum of all knowledge, owned by each individual in the organization, that gives the company a competitive advantage on the market
L. Edvinsson i M. S. Malone (1997)	Knowledge, experience, technology, customer relations, professional skills that give a competitive advantage in the market
G. Roos i J. Roos (1997)	The sum of hidden assets not included in the financial statements. It includes what stays in the heads of employees and what stays after employees go home
J. Nahapiet, S. Ghoshal (1998)	Knowledge and abilities of a specific community. The company is an intellectual community. Organizational culture, as well as social capital, are an element of intellectual capital.
S. Harrison i P.H. Sullivan (2000)	Knowledge that can be turned into value

**Table 2. Intellectual capital of the region (country) (Source: Wosiek)**

Autor	Definitions of intellectual capital of the region (country)
Y. Malhotra (2003)	Hidden resources of the nation which are the basis for the growth of its economic potential, prosperity, and position in the world; the ability (of the region) to generate new values based on already owned resources
N. Bontis (2004)	It covers hidden values of citizens, businesses, institutions, communities, and regions that are current and potential sources of wealth generation
L. Edvinsson (2005)	The region's ability to qualitatively combine new skills to create new values; it is identified with intangible assets and knowledge possessed by the enterprise
G. Schiuma, A. Lerro, D. Carlucci (2008)	A group of knowledge assets that are assigned to a specific region and significantly determine the mechanisms of creating value in this region

Despite ongoing disputes among scientists about the definitions developed so far, however, many common features can be found. The authors refer primarily to the knowledge and competencies of individuals and entire communities. All definitions are also in line that this capital is unobservable and is the basis for building a competitive advantage and creating market values [13].

Elements that create intellectual capital have not yet been defined. The literature on the subject most often meets the structure of intellectual capital consisting of capital: human, social, structural, and relational [8].

Human capital is identified with the knowledge assigned to a person. In a narrow perspective, it is knowledge, level of education, and individual competencies of citizens in achieving specific tasks and goals. In a broad perspective, it covers all the features that affect the individual's productivity, that is, the resources of knowledge, skills, energy, and health realized

in a specific nation and every citizen. Human capital is also the ability to create interpersonal relations based on understanding and trust [5].

Social capital is a category of knowledge which, enabling cooperation, increases the welfare of social groups. It also coordinates individual and group activities in the public sphere, that is, it specifies the existing patterns of conduct and supplements the shortages of other capitals in problem situations. In this situation, social capital affects the efficiency of economic processes [14].

Structural capital consists of social and technical infrastructure. Social infrastructure is a team of institutions providing access to education, thus satisfying the educational needs of the population. Technical infrastructure is created by widely understood living and working conditions in the region. It also includes transport and communication infrastructure (including telephone infrastructure and internet access) [12].

Relational capital determines the degree of market recognition and the scope of the company's relationship with its contractors. It includes elements such as company logo, customers and their loyalty, distribution channels, contracts, contracts, and agreements with subcontractors, business partners, investors, banks, public institutions, etc. Relational capital also means knowledge about competitors' strategies and external conditions, including the country's economic situation and government policy [2]. It is embedded in internal relations and includes the ability of a given country to create an attractive and competitive environment [11].

## 2 Material and Methods

The region's intellectual capital cannot be measured in zlotys (as opposed to the enterprise's intellectual capital). Therefore, a qualitative analysis seems to be necessary, thanks to which it is possible to diagnose the level of intellectual capital. In this situation, its value can not be estimated, however, it is possible to monitor the changes of individual indicators over time and at the same time to draw conclusions about the rate of its development, or to compare with other regions, creating a ranking of areas with the highest level of intellectual development [2].

In addition to the relations between components of intellectual capital of the region, the dependencies between them and, for example, economic growth, economic development, or the state of the economy, are also often examined. In this situation, many research methods are used. Econometric analysis is particularly useful.

This work presents the author's model of measuring intellectual capital. In comparison to the methods used in the literature, this proposal contains some improvements, although it probably should not be treated as universal.

### 2.1 Model

Intellectual capital indicators were used to make an econometric analysis. The study was carried out on panel data, that is, data that is observed in at least two dimensions. This type of data is a two-dimensional variable, conditioned by time and space [10]. Thus, the study examined the impact of selected intellectual capital factors on GDP in each of the sixteen Polish voivodships in 2010-2015. Assuming that the index  $i = 1, 2, \dots, N$  denotes further regions (voivodeships), and the index  $t = 1, 2, \dots, T$  denotes time units (see Table 3), then the constructed model will be in the form:

$$GDP_{it} = \alpha_{it} + \alpha L_{it} + \alpha U_{it} + \alpha R_{it} + \alpha J_{it} + v_{it} \quad (1)$$

where:  $GDP_{it}$  - dependent variable: gross domestic product per capita in PLN (current prices)

independent variables:

- $L_{it}$  - total number of university graduates,

- $U_{it}$  - total number of persons with the decision of granting benefits according to the main forms of assistance,
- $R_{it}$  - patents granted by the Patent Office of the Republic of Poland (UPRP),
- $J_{it}$  - total number of employed in R&D,
- $\alpha_{it}$  - a structural parameter of the model,
- $v_{it}$  - total random error (consisting of a purely random part  $\varepsilon_{it}$  and individual effect  $u_i$ , hence  $v_{it} = \varepsilon_{it} + u_i$ )

**Table 3. Assigning indexes to individual voivodships and periods (Source: BDL)**

	<b>i</b>	<b>t</b>
1	Łódz	2010
2	Mazovian	2011
3	Lesser Poland	2012
4	Silesian	2013
5	Lublin	2014
6	Podkarpackie	2015
7	Podlasie	
8	Świętokrzyskie	
9	Lubusz	
10	Greater Poland	
11	West Pomeranian	
12	Lower Silesia	
13	Opole	
14	Kuyavian-Pomeranian	
15	Pomeranian	
16	Warmian-Masurian	

## 2.2 Model estimation

In the empirical study, statistical data from the Local Data Bank ([www.bdl.stat.gov.pl](http://www.bdl.stat.gov.pl)) were used. The results of the model described above are presented in the following tables and in the chart. Below them are the results of the most important and necessary tests. The estimation of the least-squares method for the panel model and the Breusch-Pagan test were presented. Next, a model with fixed effects and a model with random effects along with the Hausman test, used to verify the type of effect, were described [9].

Estimation using the classical least-squares method (CLS) is considered acceptable when the individual effect does not occur and the panel is treated as a cross-sectional data set [10]. This is the situation in the examined model.

## 3 Results and Discussion

Using the GRETL econometric program, the estimation presented in Table 3 was obtained. It contains numbers characterizing and describing the results of panel estimations using the least-squares method [7].

**Table 4. Panel LSM estimation using 96 observations, 16 cross-sectional data units are included, time series length = 6, the dependent variable (Y): GDP\_i\_t (Source: GRETL)**

	Factor	Standard error	Student's t-	p-value	
const	31336,7	994,023	31,5252	<0,0001	***

L_i_t	0,168319	0,0632256	2,6622	0,0092	***
U_i_t	-0,125558	0,0273119	-4,5972	<0,0001	***
R_i_t	10,9263	3,39077	3,2224	0,0018	***
J_i_t	41,9855	3,79442	11,0651	<0,0001	***
The arithmetic mean of the dependent variable	38547,21	The standard deviation of the dependent variable	9832,142		
The sum of squared residuals	1,02e+09	The standard error of the residues	3355,056		
Coefficient of determination R-square	0,888462	Adjusted R-squared	0,883560		
F(3, 156)	181,2172	P-value of F test	1,88e-42		
Log-likelihood	-913,0001	Akaike information criterion	1836,000		
Schwarz Bayesian Criterion	1848,822	Hannan-Quinn Criterion	1841,183		
Autocorrelation of residues - rho1	0,789099	Durbin-Watson status	0,296375		

**Figure 1. Frequency distribution for uhat1 (Source: GRETL)**

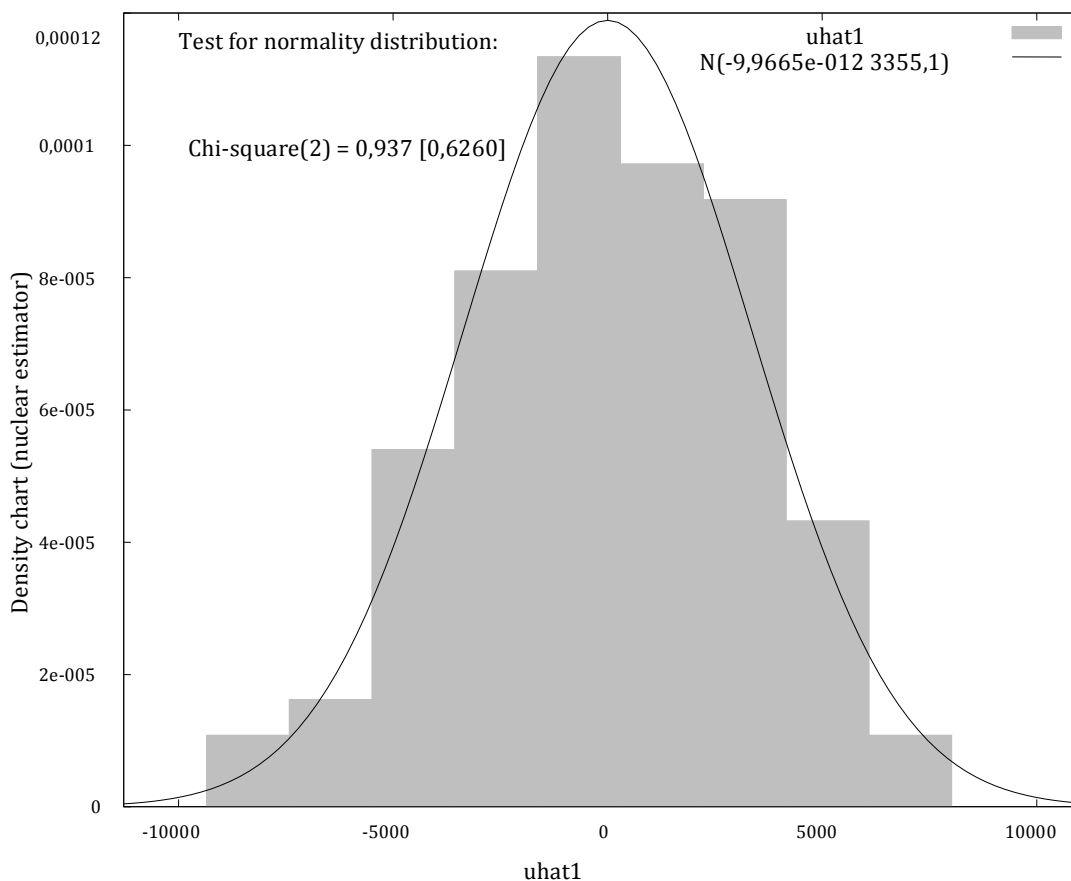


Table 5 shows the frequency distribution for uhat1. The number of observations ranges from 1 to 96. The number of intervals in the study is 9, the average is -9,96655e-012 the standard deviation is 3355,06.

**Table 5. Frequency distribution for uhat1 (Source: GRETL)**

Intervals	Mean	Number	Frequency	Cumulated	
< -7417,5	-8382,2	2	2,08%	2,08%	
-7417,5 - -5488,2	-6452,8	3	3,13%	5,21%	*
-5488,2 - -3558,9	-4523,5	10	10,42%	15,63%	***

-3558,9 - -1629,6	-2594,2	15	15,63%	31,25%	*****
-1629,6 - 299,74	-664,91	21	21,88%	53,13%	*****
299,74 - 2229,1	1264,4	18	18,75%	71,88%	*****
2229,1 - 4158,4	3193,7	17	17,71%	89,58%	*****
4158,4 - 6087,7	5123,0	8	8,33%	97,92%	***
>= 6087,7	7052,3	2	2,08%	100,00%	

The null hypothesis assumes that the empirical distributor has a normal distribution. The Doornik-Hansen test (1994) indicates the presence of transformed skewness and kurtosis. Chi-square (2) is equal to 0,937, with a p-value of 0,62601.

When estimating panel data, the collinearity for VIF(j), that is, the variance inflation factors, was evaluated. The minimum possible value for VIF is 10; when as a result of the calculations the obtained values are less than 10, this may indicate a collinearity problem, that is, the inflation of variance. In the case study, the collinearity is at the level of:

- $L_{i,t} = 2,444$
- $U_{i,t} = 2,931$
- $R_{i,t} = 5,644$
- $J_{i,t} = 4,334$ .

$VIF(j) = 1 / (1 - R(j)^2)$ , where  $R(j)$  is a multiple correlation coefficient between the variable 'j' and other independent variables of the model. Parameters of matrix  $X'X$ : m1-norm =  $3,0238897e+011$ , determinant =  $2,0676035e+034$  and indicator of matrix conditioning CN =  $3,7599083e-011$ .

$VIF(j)$  equals  $1/(1 - R(j)^2)$ , where  $R(j)$  is the multiple correlation coefficient between the variable 'j' and the other independent variables of the model. The results indicate that there is no collinearity problem in the tested model.

To check whether the described panel model can be estimated using KMNK, the hypothesis about the existence of an individual effect was verified, that is, whether the variance of the random component is equal to 0. Breusch-Pagan test served this purpose [10].

As a consequence, Table 6 presents the estimated determined effects, that is, diagnostics for a balanced panel with 16 units in cross-section and for 6 periods.

**Table 6. Estimated fixed effects (non-random effects) that take into account the diversity of free expression according to the units in the cross section (Source: GRETL)**

	Coefficients	Standard errors	Value p
const	34984	3504,9	0,00000
$L_{i,t}$	-0,3035	0,091252	0,00136
$U_{i,t}$	-0,0030729	0,029893	0,91839
$R_{i,t}$	14,094	5,3856	0,01070
$J_{i,t}$	25,31	3,5006	0,00000

Residual variance:  $1,44142e+008 / (96 - 20) = 1,89661e+006$ .

The total significance of group means inequality:

- $F(15, 76) = 30,9391$  with a p-value  $3,02332e-026$

A low p-value means the rejection of the hypothesis  $H_0$  that the panel model LSM is the correct one, regarding hypothesis  $H_1$  that the model with fixed effects is more appropriate.

Breusch-Pagan's test statistic:

LM = 78,1026 with a p value =  $\text{prob}(\text{chi-square}(1) > 78,1026) = 9,78231e-019$ .

A low p-value means the rejection of the hypothesis  $H_0$  that the LSM panel model is the correct one, regarding hypothesis  $H_1$  that the random effects model is more appropriate.

Variance estimators:

- between =  $8,47957e+006$
- within =  $1,89661e+006$

- theta used for quasi-demeaning = 0,806925.

**Table 7. Estimated random effects allow for a unit-specific component to the error term (Source: GRETL)**

	Coefficients	Standard errors	Value p
const	30634	1562,3	0,00000
L_i_t	-0,16187	0,062882	0,01166
U_i_t	0,0080739	0,023928	0,73657
R_i_t	17,821	3,4608	0,00000
J_i_t	30,559	2,2728	0,00000

Hausman test statistic:

$H = 23,0488$  with a p value =  $\text{prob}(\text{chi-square}(4) > 23,0488) = 0,000123816$ .

A low p-value indicates rejection of the null hypothesis of the model with random effects, against alternative hypothesis of the model with fixed effects.

The model presented by the author, enables to take into account many aspects of intellectual capital. The theoretical values of intellectual capital at the level of voivodships were determined in the work and the estimation of other categories included in the model was obtained. It can be therefore concluded that the applied method enabled the measurement of intellectual capital components and gave the opportunity to examine the relationships between variables.

#### 4 Conclusion

Conclusions arising from theoretical considerations and observations of business practice indicate that coherence and related coordination of intellectual capital elements ensure sustainable foundations for the development of organizations and regions, and for building their competitive advantage. Defining intellectual capital and its components is a priority for further initiatives related to it. This is particularly important when measuring intellectual capital.

The econometric analysis carried out in the article allows for the formulation of several conclusions.

- the most important is that the estimation using the classic least-squares method is a useful tool for analyzing problems related to the study of intellectual capital components,
- all four examined indicators should be included in factors that are the determinants of the GDP in voivodeships that were taken into account. The identification of these factors has a positive impact on the competitiveness of the regions,
- the following factors have a statistically significant impact on the volatility of GDP in considered regions: total number of university graduates, total number of persons with the decision of granting benefits according to the main forms of assistance, patents granted by the Patent Office of the Republic of Poland (UPRP), total number of employed in R&D.

The unsatisfactory effect is the fact that the applied research methods ultimately did not allow to unequivocally capture the nature of the links between the intellectual capital and the processes of socio-economic development. The econometric analysis carried out in the article allows to determine the extent to which the measured intellectual capital indicators affect the competitiveness of regions in Poland.

Ultimately, the obtained results of the study should be considered satisfactory, although this subject certainly requires further discussion and research, not only in the area of quantitative, but also qualitative analysis. The search for universal ways to measure this category of capital would certainly give a newer and more recent look at this research area, and an in-depth analysis of intellectual capital in regions would indicate the dominant tendencies in shaping this capital in these areas.

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# Electoral System Cost-Efficiency in the Czech Republic

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## Abstract

In recent years, more and more countries are in the so-called crisis of democracy. One of their symptoms is the lack of interest of a growing group of citizens on public affairs, which is reflected in long-term declining voter turnout. Holding elections as a kind of public good that the government ensures for citizens is very costly. Most of the total CZK 500 million represents the costs of the municipalities, which ensure immediate "contact" of the voters with the government (country) - they set up a polling station in each electoral district.

In connection with the decreasing voter turnout, this paper deals with the analysis of the current costs of municipalities using the performance indicators. It is also outlined the possibility of lowering election costs by changing the structure of electoral districts. Its aim is to increase cost-efficiency especially in municipalities that should realize so-called economies of scale. An example of a country where electoral districts in larger cities are being set up more efficiently is Poland. The way of setting up larger electoral districts in larger cities is transferred to the conditions of the Czech Republic and subsequently, the potential savings are modeled. If there were merging electoral districts and setting up fewer polling stations, the total savings would be approx. 35% while the availability of polling stations for citizens would remain comparable.

*Keywords: elections; voter turnout; costs; efficiency*

JEL Classification: H41, H76

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## 1 Introduction

Before 1989, the ruling Socialist regime used the election as a mechanism to test the loyalty of the population, while maintaining government legitimacy, without giving voters the real opportunity to express their preferences in the open competition of political parties. The breakthrough occurred in 1989. Now it is possible to consider the election as the real possibility for political parties to offer their visions and programs to fulfill them, but also voters with their right to freely express their preferences. [10]

However, the initial enthusiasm of citizens for the choice of political party choice has faded. After more than twenty years of free society, our democracy is at the so-called crisis point. Its manifestation is the decreasing interest of citizens in public affairs, and hence the declining electoral participation in most European countries. [16] In the Czech Republic, only a traditional voting method is allowed, consisting simply of the voter coming to the respective polling station and the ballot to the ballot box.

Decision-making of citizens - eligible voters (according to Article 18 of Act No. 1/1993 Coll., Constitution of the Czech Republic, every citizen who has reached the age of 18 has the right to vote) whether or not to participate in the election depends, in addition, to political conviction or awareness on the importance of the election process also on the circumstances related to their personal life. Specialists in the theory of participation agree on a total of five approaches. [4, 7, 12] The first is the theory of resources, which emphasizes the socio-economic factors and the physical ability of the citizen to sacrifice time and money to participate in the elections. The second is the so-called mobilization theory, respectively. The pressures of various social groups, along with the positive and negative mobilization potential of political parties. The third is the theory of a specific context, which can be briefly described as the influence of the importance of the individual elections in the voter's eyes, or even the charisma of the individual

candidates. The other two theories deal with the sociological and psychological justification of the electoral participation, which, however, does not necessarily reflect only the objective political interests of voters, but also, for example, their influence on the social environment. [3]

The goal of the government is to provide public goods and services for citizens (including preparation and holding of elections) in the most efficient way [1] and there are many articles about analyzes and possibilities how to improve it. [2] The efficiency of provided public goods can be understood as providing the greatest possible comfort for citizens with a minimum amount or quantity of waste, expense or unnecessary effort. For example, in the case of elections (while preserving the same parameters of all approaches to the theory of participation), it may be both a reduction in direct costs (e.g. wages) or a reduction in indirect costs (e.g. public tenders for renting computing, changing the structure of electoral districts).

Given the very low unemployment and the labor shortage in the labor market, the reduction of direct costs cannot be considered a suitable solution. The aim of the paper is to find out whether there is a possibility of reducing the indirect costs of holding elections by the change in the structure of electoral districts.

The following hypotheses are tested:

- Electoral participation is lower in larger electoral districts.
- Larger municipalities in the Czech Republic are not efficient in setting up electoral districts and do not realize so-called economies of scale.
- Changing the structure of electoral districts in the municipalities would make it possible to reduce the costs of holding elections in these municipalities by at least 30%.

## **2 Material and Methods**

The paper works with primary elections' data and information about elections in the Czech Republic (electoral participation data and elections' costs) published by the Czech Statistical Office and the Ministry of Finance. Because of several types of elections and different voter turnout, costs and other data (number of electoral districts, number of eligible voters in the electoral districts etc.) over time, the election data for the Chamber of Deputies of the Parliament of the Czech Republic are used. These elections have the highest turnout in the long run and therefore can be considered as the most important national elections in the Czech Republic.

In addition, primary elections' data in Poland are used, including the impact on voter turnout. Poland was chosen as an example of a country that is very similar to its geographic, socio-economic and political situation, the standard voting method prevails and the electoral system is proportional to the Chamber of Deputies of both countries. For comparability, elections to the Polish Sejm were selected in 2015 – these elections can be considered the most important nationwide elections in Poland.

Analyzes are based on calculations of basic descriptive statistics and performance indicators - costs per one electoral district and costs per one eligible voter, according to the size of the municipalities according to the scope (level) of their competence. The chi-squared test is used to determine whether there is a significant difference between the expected frequencies of voter turnout and the observed ones. Next, modelling of savings are based on results of linear regression functions for every municipality type. Input data for the regression functions are obtained as the means of all cost items per one electoral district for each municipality. The total amount of cost are the sum of individual costs (the total costs for every municipality).

## **3 Results and Discussion**

Elections as a basic tool of representative democracy are a service provided by the state for about 8.4 million eligible voters. At present, a large number of elections are held in the Czech Republic - elections to the Chamber of Deputies of the Parliament of the Czech Republic, the Senate of the Parliament of the Czech Republic, municipal councils, regional councils, the

European Parliament, and finally the presidential election. In the course of 25 years there has been a significant increase in the number of elections, since 1993 there have been 23 national elections in the Czech Republic, and over the next eight years, 10 regular national elections are projected. Such a number of different elections give citizens the opportunity to participate very much and quite often but from the point of view of the government, it is a very expensive provision of public service. Since 2010, a total of CZK 4.9 billion has been spent in connection with the elections in the Czech Republic:

**Table 1. Costs connected with elections in the Czech Republic (mil. CZK) (Source: [11])**

Type of elections	2010	2011	2012	2013	2014	2015	2016	2017*)
Parliamentary	516.7	20.3	80.8	489.8	55.0	3.4	42.1	516.5
Regional self-government units	514.5	34.7	494.1	8.0	491.3	42.4	476.2	26.5
European Parliament	25.0	0.0	0.0	0.0	450.0	3.7	0.0	0.0
Presidential	0.0	0.0	0.0	452.8	20.0	0.0	0.0	155.9
Total	1,056.2	55.0	574.9	951.0	1,016.3	49.5	518.3	698.9

\*) planned budget

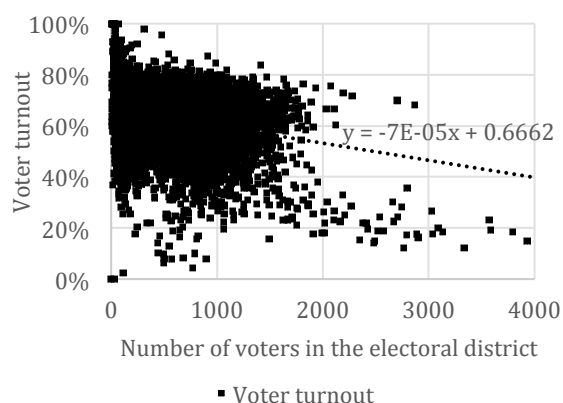
The last elections to the Chamber of Deputies of the Parliament of the Czech Republic were held in the autumn of 2017. Costs in the total amount of CZK 516.5 mil. were expected for these elections. This amount consisted of costs of the Czech Statistical Office (CZK 66.4 mil.), the Ministry of the Interior (CZK 33 mil.), the Ministry of Foreign Affairs (CZK 2.5 mil.) and the general treasury, in particular, municipal costs (414.6 mil.). Since the detailed breakdown of municipal costs are not available yet and it is not possible to determine the exact costs of individual municipalities, this paper uses the breakdown of costs from the previous elections which held in 2013. The costs increased approximately 6% and correspond to the inflation.

### 3.1 Voter turnout analysis

According to voter turnout (around 60%) [6], the elections in the Chamber of Deputies are generally considered as the most important in the Czech Republic. On the contrary, for example, elections to the Senate and the European Parliament have very low voter turnout, which often does not reach 20%. [6]

However, the participation in individual electoral districts differs statistically significantly (chi-square test was performed on a level of significance  $\alpha = 0.050$ ,  $p$ -value relative to the observation number is 0.000). Generally speaking, with increasing number of eligible voters in the electoral district, the voter turnout decreases in the Czech Republic (Fig. 1). On the contrary, in Poland, the number of eligible voters and voter turnout is in the positive relationship (with the increasing size of the electoral district, voter turnout also increases) (Fig. 2).

**Figure 1. Voter turnout in the CZ districts (Source: Author based on [6])**



**Figure 2. Voter turnout in the PL districts (Source: Author based on [15])**

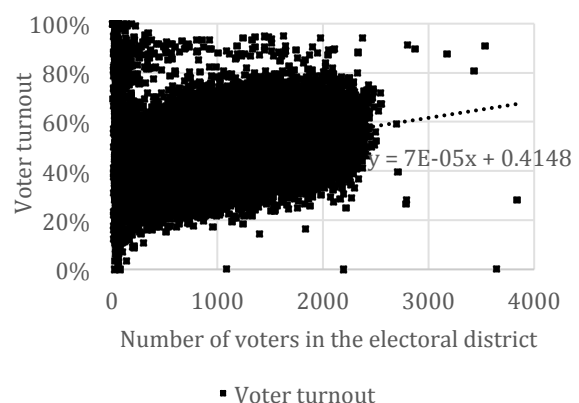
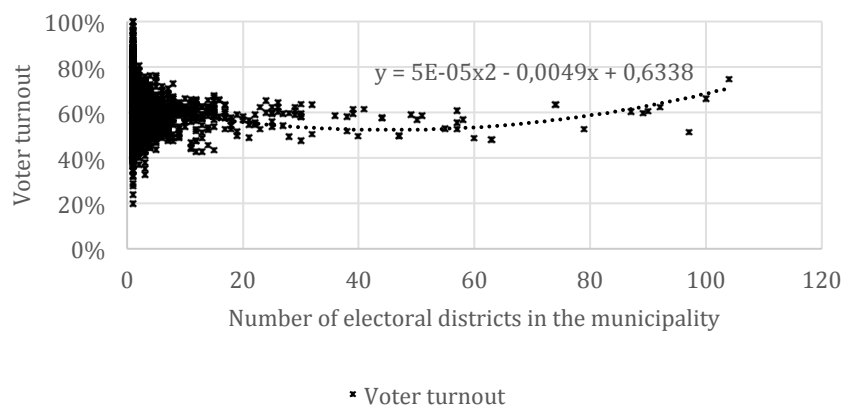


Figure 3 shows that the voter turnout in the Czech Republic is highest in the small municipalities (municipalities with only one district), in municipalities with more electoral districts the voter turnout is decreasing. On the other hand, municipalities with a high number of electoral districts (statutory cities or the Capital City of Prague) have a higher turnout. These are cities that usually often set up more polling stations at the same address (in the same building e.g. schools, municipal offices, etc.).

**Figure 3. Voter turnout in the CZ municipalities (Source: Author based on [6])**



### 3.2 Cost efficiency

Setting up more polling stations in the same place has virtually no effect on the electoral participation of voters (voters' voting costs are neither reduced nor increased). There is, therefore, a risk of inefficiency in the setting up of such polling stations, and the question arises as to whether larger cities are realizing so-called "economies of scale". Unlike smaller municipalities, they can influence the number of eligible voters in the electoral district by combining them. This could result in a relative reduction in the number of electoral districts and thus in the costs associated with them. This would result in greater cost-efficiency (e.g. the cost per one eligible voter).

The following tables contain the average values of the selected performance indicators – costs per one electoral district and costs per one eligible voter, according to the size of the municipalities according to the scope (level) of their competence (capital city of Prague – Prague, statutory cities – SM, municipalities with extended competences – III.ST, municipalities with authorized municipal authority – II.ST and municipality with a basic scope of delegated competences – I.ST):

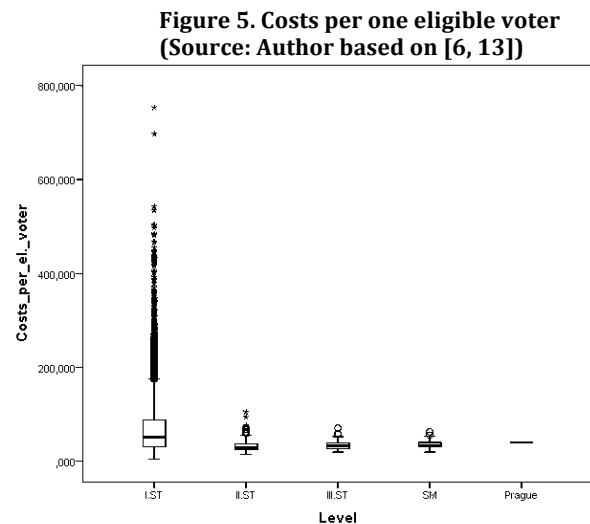
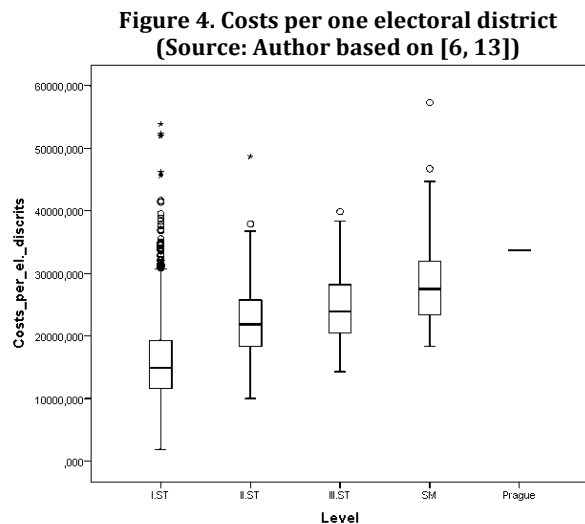
**Table 2. Costs connected with elections in the Czech Republic per electoral district (means, CZK) (Source: Author based on [6, 13])**

Level	Number of municipalities	Wages / el. district	Services /el. district	Catering /el. district	Rent / el. district	Material / el. district	Total / el. district
I.ST	5,845	10,035.7	1,151.3	800.6	250.6	1,896.9	15,814.2
II.ST	183	13,259.7	2,454.6	813.0	1,077.6	1,748.6	21,947.4
III.ST	180	15,164.6	2,597.9	729.5	1,404.2	1,532.3	24,574.9
SM	25	18,784.9	3,832.7	869.6	2,723.0	1,111.9	31,189.3
Prague	1	17,858.5	6,285.1	928.2	2,675.4	2,096.7	33,676.2

**Table 3. Costs connected with elections in the Czech Republic per eligible voter (means, CZK) (Source: Author based on [6, 13])**

Level	Number of municipalities	Wages / el. voter	Services /el. voter	Catering / el. voter	Rent / el. voter	Material / el. voter	Total / el. voter
I.ST	5,845	25.8	3.0	2.1	0.6	4.9	40.6
II.ST	183	19.2	3.6	1.2	1.6	2.5	31.7
III.ST	180	20.8	3.6	1.0	1.9	2.1	33.7
SM	25	23.1	4.7	1.1	3.3	1.4	38.3
Praha	1	21.3	7.5	1.1	3.2	2.5	40.2

The data show that larger municipalities (statutory cities and the capital city of Prague), which should realize the greatest economies of scale, have approximately twice higher costs per one electoral district than small municipalities (I.ST). With the growing size of the municipality, the average costs per electoral district (Fig. 4) also increase. However, the costs per one eligible voter are comparable in almost all municipalities, despite the fact that small municipalities have to set up the electoral district often even for the very low number of inhabitants living in this village (this is why the costs of one eligible voter are so variable) (Fig. 5). In particular, statutory cities do not create sufficient conditions for the costs to be spent in these cities to be spent economically and efficiently and to achieve maximum economies of scale (while preserving the same availability of electoral rooms for voters).



**Modeling of savings**

In order to increase the cost-efficiency of election funding, the possibilities of reducing the number of electoral districts in larger municipalities (municipalities with more than one electoral district) were analyzed. The potential merging of the electoral districts could result in economies of scale, i.e. assuming different costs per one electoral district in individual municipalities, the costs per one eligible voter could be reduced. At the same time, the availability of the polling station for eligible voters would be maintained so voter's economic costs to vote would not increase.

Subsequently, the basic cost characteristics of the current state (Alternative 0) were analyzed and two alternatives were modeled:

- Alternative A1 - There will be no more than 1,000 eligible voters in the electoral district, and there will be at least one polling station in each municipality.
- Alternative A2 - There will be no more than 1,500 eligible voters in the electoral district and there will be at least one polling station in each municipality.

The condition that there will be at least one polling station in each municipality will ensure that the economic costs of the voter do not rise. By not changing the parameters on the

eligible voters' side, it can be assumed that this change will not affect the voter turnout. Similarly, it is also in larger municipalities where it would not be necessary to set up more polling stations in one building (e.g. schools, libraries). Table 4 shows the estimated costs of all alternatives:

**Table 4. Modeled costs - all alternatives, all main cost items (CZK) (Source: Author)**

Alternative	Alternative A0	Alternative A1	Alternative A2
Wages	193,452,675.48	166,570,939.59	127,973,098.19
Material	25,287,369.25	21,939,352.73	18,221,358.30
Services	33,877,261.42	28,535,593.40	20,835,622.45
Rent	15,897,788.49	12,431,045.04	8,619,585.15
Catering	11,929,996.88	10,398,189.80	8,293,913.33
Total	317,383,997.44	270,788,104.28	207,596,090.07

If municipalities would set up electoral districts on average for 1,000 eligible voters (A1), the costs would be reduced about CZK 47 million. In the case of the second alternative, where there would be no more than 1,500 eligible voters in the electoral districts, the savings would be almost CZK 110 million. Most of these potentially saved finances represent wage costs - rewards for members of electoral district committees (61%).

The largest savings would be realized in larger municipalities (statutory cities and the capital city of Prague), see Table 5:

**Table 5. Modeled costs - all alternatives, all levels (CZK) (Source: Author)**

Level	I.ST	II.ST	III.ST	SM	Prague
<b>Alternative A0</b>					
Number of electoral districts					
Mean	1.32	5.16	14.83	91,76	1,101
Lower bound (95% conf.i.)	1.30	4.72	13.56	59,09	
Upper bound (95% conf.i.)	1.35	5.59	16.09	124,43	
Std. Deviation	0,91	2.98	8.60	79.14	
Total (CZK)					
Mean	20,949	113,215	364,392	2,861,934	37,077,520
Lower bound (95% conf.i.)	20,512	102,812	328,508	1,651,641	
Upper bound (95% conf.i.)	21,386	123,618	400,276	4,072,227	
Std. Deviation	17,041	71,326	243,971	2,932,056	
<b>Alternative A1</b>					
Number of electoral districts					
Mean	1.18	4.09	11.33	75,28	922
Lower bound (95% conf.i.)	1.16	3.78	10.37	48,12	
Upper bound (95% conf.i.)	1.19	4.40	12.29	102,44	
Std. Deviation	0,53	2.12	6.52	65.80	
Total (CZK)					
Mean	19,318	93,528	282,820	2,352,043	31,049,476
Lower bound (95% conf.i.)	18,948	84,594	254,838	1,359,083	
Upper bound (95% conf.i.)	19,688	102,462	310,801	3,345,002	
Std. Deviation	14,442	61,252	190,245	2,405,544	
<b>Alternative A2</b>					
Number of electoral districts					
Mean	1.07	2.86	7.72	50.32	615

Lower bound (95% conf.i.)	1.07	2.66	7.08	32.21	
Upper bound (95% conf.i.)	1.08	3.07	8.36	68.43	
Std. Deviation	0,31	1.43	4.34	43.88	
Total (CZK)					
Mean	17,267	65,374	192,668	1,572,703	20,710,876
Lower bound (95% conf.i.)	17,012	59,349	173,927	909,344	
Upper bound (95% conf.i.)	17,521	71,399	211,410	2,236,063	
Std. Deviation	9,925	41,307	127,421	1,607,054	

For both alternatives, cost-efficiency would increase. Statutory cities costs per one eligible voter in Prague would decrease from CZK 40.22 to CZK 33.68 and in statutory cities from CZK 38.31 to CZK 31.48 (alternative A1), which represents a total cost reduction of 40.29% of these cities. In alternative A2, there would be another cost reduction to CZK 22.47 per voter in Prague, and to CZK 21.05 in statutory cities. The total cost reduction ranging from 14.68% to 34.59%. By doing so, larger cities could realize the economies of scale mentioned above and make the whole election system more economy and cost-efficiency.

Contributions that work with electoral systems in terms of their cost-efficiency are very rare. The reason can be the sensitivity of this topic from the point of view that “democracy is not free of charge”. Many researchers, however, pay attention to sociological aspects - they examine decision-making and voter preferences [5], or influences that have an impact on voter turnout. [9] The aim of this paper was to create and broaden the view of the perceptions of the election not only as a social problem of the choice theory [14] but also of the cost of the society itself. Motives for people should be, therefore, using their legal rights and to participation not only in order to determine the future direction of the territorial unit in which they live but also to use the public services offered to them by the country. Only then these services can be evaluated as effective and meaningful.

#### 4 Conclusion

The paper deals with the costs analysis and modeling in connection with the holding of elections as public goods (public services) that the government provides for its citizens. First, it was investigated whether the size of the electoral districts significantly influenced the voter turnout. While in the Czech Republic, larger electoral districts (electoral districts with a higher number of eligible voters) have a lower electoral turnout, in Poland, it is the opposite. It is thanks to a different way of setting up electoral districts. In Poland, electoral districts are more extensive and there are usually no remote parts of municipalities with a small number of eligible voters with a polling station. However, this does not affect electoral participation in the electoral districts of larger cities - instead of several polling stations in one place (e.g. in schools), there is only one polling station in this place. The “voting” costs per one eligible voter to vote do not change in this case, but the government realizes economies of scale (the costs per eligible voter is lower). This is not the case in the Czech Republic and the costs per one eligible voter are almost the same all municipalities.

Based on these findings, costs were modeled in the case of merging electoral districts in larger cities in such a way that there was no significant change in the voters' voting costs because of no change of the parameters on the eligible voters' side. So, it can be assumed that this merging of electoral districts will not affect the voter turnout. In both cases, there was a significant total cost reduction, ranging from 14.68% to 34.59%, depending on how many eligible voters the polling station (polling station) would be set up for.

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# Public-Private Partnerships at the Municipal Level

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## Abstract

Public-private partnerships became part of the life of modern economics as a tool, which enables state or local government to carry out their competences at a time when it is ambitious to increase public need and decrease public expenditure. The goal of our paper (case study) is to present a set of analytical data comparing public private partnership and traditional public procurement at the municipal level in Slovakia. This study uses a quantitative approach to investigate the research question. The study analyses the original collected survey data from our own research. Ideally, the relative costs and benefits of PPPs should be evaluated over the entire project lifecycle, from commencement of construction through operations and maintenance to the end of the contract period. However, most projects are either still under construction or in the early stages of operation and most available information relates to the construction phase. For that reason, the analysis does not allow for drawing normative conclusions about the desirability of PPP as a procurement method.

*Keywords: public-private partnerships; municipality, local government, Slovakia*

JEL Classification: H43, H57, H72, H76

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## 1 Introduction

(Traditionally, government has been the principal provider of public infrastructure. Over the last decade, this position has begun to change. Most of the developed countries have implemented new principles of public sector reform – new approaches to the management of the public sector – New Public Management (NPM). A major feature of NPM according to many authors [3, 11, 12, 14, 16] is the introduction of market type mechanisms (MTM) to the running of public service organizations: the marketization of the public service delivery and public infrastructure project implementation. Marketization aims at a continuous increase in public expenditure efficiency, continual improvements in public services and public infrastructure quality, the implementation of professional management tools in the public sector, emphasis on devolution and delegation, emphasis on audit and inspection and, last but not least, the plurality system of ownership forms in public service delivery and public infrastructure project implementation. Infrastructure has begun to emerge as a major investment class. In recent years, a new phenomenon, the Public-Private partnership (PPP), has come to prominence in a number of developed and developing countries, breaking down the traditional barriers between the public and private sectors.

Public Private Partnership (PPP) is an engagement between a governmental agency and a private or non-governmental agency in order to administer a public service. According to Grimsey and Lewis [6], PPPs can be defined as arrangements where public sector bodies enter into long-term contractual agreements in which private parties participate in, or provide support for, the provision of infrastructure, and a PPP project results in a contract for a private entity to deliver public infrastructure-based services. PPP combines procurement, where the public sector purchases a product from the private sector, with an extension of contracting-out, where public services are contracted out to the private sector. It differs from contracting out since the private sector provides the capital asset as well as the services. A PPP contract is intended to provide a continuing commercial incentive for synergy, flexibility and efficiency right through from initial design, construction and operation. It is a whole life cycle approach to

service delivery. PPPs describe an actual partnership relationship between the public and private entities involved in a specific project.

PPP projects come under a variety of forms. The most common forms are some variant or another of design-build-finance-operate (DBFO), in which a concessionaire from the private sector designs, builds, and finances a certain facility (e.g., an airport) and then operates it as well, or build-operate-transfer (BOT), in which a concessionaire finances and builds a facility, operates it, and transfers it to the government at the end of the concession period. The build-operate (BO) combination features in all of these arrangements. The basic principle is that state departments are transformed from being owners and operators of assets to become purchasers of services from the private sector, with the private sector becoming long-term providers of services which they deliver by taking the responsibility for the design, construction, financing and the operation of public assets.

Public infrastructure projects in the form of public-private partnerships are a legal, economic and personnel-intensive process. Recent international evaluations of experience with public private partnership [5, 10, 12, 13, 14, 15] indicate that the conditions for a successful realization of this partnership have to be created: an appropriate legal environment for public-private partnership development; citizen participation in a transparent public decision-making process; measuring performance in the public sector; a modern form of public service delivery and public infrastructure project management; and a functional market mechanism.

A frequently debated issue in relation to the implementation of different forms of public-private partnership in professional circles is the need to create a specific legal rule regulating the area of public-private cooperation. If such a rule actually arises, then it is doubtful whether it should cover all possible forms of public-private partnerships and determine their content and precise procedures for selecting a private partner. Experts from several countries have yet to propose a clear answer to questions about the need for a specific legal rule governing public-private cooperation and its scope. Some countries (Ireland, Portugal and Belgium) have legislated this area with specific legal standards, others (the UK and France), on the contrary, do not have specific legal arrangements for public-private partnerships, and yet many successful partnership projects between the public and private sectors exist.

The Slovak Republic does not prefer regulation of the aforementioned area by a specific legal norm. The issue of public-private partnerships is governed by a number of regulations governing public procurement, fiscal supervision, the competences of individual ministries, the competence of regional self-governing units, and the protection of creditors, etc. The question is whether it is easier to make adjustments to all of these legal norms, the scope of which could be affected by the various forms of partnership, or to consolidate all legislation into a cross-sectional legal standard. In our opinion, however, the minimum concession issue will require specific legal regulation (at present, the concession arrangement is part of the Act of the National Council of the Slovak Republic No. 25/2006 Coll. On Public Procurement).

Another contentious issue is the legal definition of public-private partnerships as well as their content. There is no general characteristic or classification of public-private partnerships, and it would be extremely difficult (perhaps to some extent restrictive) to introduce a precise legal definition of this area (here, to a certain degree, we identify with the view expressed by the United Kingdom). Any modification of the relevant legal standards falling within the scope of individual forms of public and private sector cooperation should include certain criteria for identifying such forms (e.g. any contractual relationship between the public sector as the contracting entity and the private sector as a supplier, a contractual relationship between the public sector as contractors and the private sector as a contractor, with public sector payment obligations covered by future revenues of the contracting entity's budget, whereby those commitments exceeding the specified percentage of the budget of the contracting authority; ...).

The legal regulation of the forms of public-private partnership should also take into account the risks associated with this form of cooperation. By concluding contracts for the provision of public services or the construction or operation and maintenance of public infrastructure, the public-sector transfers part of the risks associated with the performance of tasks in these areas to the private sector. The transfer of responsibilities to the private sector is,

of course, accompanied by the transfer of competencies, which, in the event of adverse developments in the scope and quality of public services provided, reduces the public sector's ability to make rapid and effective redress. Experience with unsuccessful public and private sector cooperation has shown that, in the event of a failure of this cooperation, other unplanned public finance implications are also revealed.

In addition to the issue of adequate legal regulation of public-private partnerships, it is also necessary to address the issues of transparency of public procurement processes that are inevitably linked to the implementation of PPP projects. Transparency requires that all processes be transparent and thus able to be evaluated in the prevalent environment, thus reducing the possibility of corruption and improper execution of competence. Transparency of a public contract makes it possible to make open decisions which can be re-verified and logically explained, concerning all phases of the award of a contract – announcement of the public procurement procedure; disclosure of the relevant terms, and set decision criteria and deadlines. Insufficient transparency may prevent private partners from participating in public procurement.

The most significant source of non-transparency and subsequent corruption may be a simple non-compliance with public procurement rules. Failure to comply with the rules on public procurement occurs in all phases of the procurement process: the choice of procurement procedure; shortcomings in the content of the notification of announcement; the procurement procedure; insufficiently precise description of the contract; establishing ambiguous conditions for participation in the tender and ambiguous criteria for evaluation of bids; establishing an unreasonably short period for the submission of bids; unjustified elimination of candidates from the tender; failure to comply with the announced terms for participation in the tender and the criteria for evaluating the tender; not respecting the choice of bidder by the selection committee when evaluating the tender; changes to the announced terms and conditions when signing the contract with the winning bidder, etc.

If the appropriate legal environment for public-private partnership development, the transparency of public procurement processes and measuring performance in public infrastructure project management are met, the change of traditional public procurement form to public private partnership in public infrastructure projects should improve efficiency and effectiveness [2, 7, 8, 10].

The issues of the legal environment for public-private partnership development and the transparency of public procurement processes were discussed above.

The issue of measuring performance in public infrastructure project management will be discussed in the analysis in following part of this paper.

The goal of our paper (case study) is to present a set of analytical data comparing public private partnership and traditional public procurement of public lighting reconstruction projects at the municipal level in Slovakia.

## **2 Material and Methods**

The goal of our paper is to present a set of analytical data comparing public private partnership and traditional public procurement of public lighting reconstruction projects at the municipal level in Slovakia.

Under traditional methods for procuring infrastructure, the public sector obtains assets separately from services. The associated services are then delivered by public sector organizations either by using their own work force, or by outsourcing or contracting-out the service provision to other specialist operators. External contracting-out and outsourcing have grown steadily as public and private sector organizations search for ways to enhance efficiency and make better use of resources. A partnership agenda takes this further and offers a different approach to traditional procurement because the acquisition of infrastructure assets and associated services is accomplished with one long-term contract, under which the initial capital outlay is financed by the private sector. One of the major objectives of PPP is to harness private

sector management expertise, and the market discipline associated with private ownership and finance, for the provision of public services. Of course, private sector skills are also employed under traditional procurement when the public sector engages private design skills, but a PPP adds a different type of inducement for those involved. The private sector entity is encouraged to plan beyond the bounds of the construction phase and incorporate features that will facilitate operations and maintenance within a cooperative framework.

This study uses a quantitative approach to investigate the research question on effectiveness of public private partnership projects in public lightning infrastructure.

The analysis will be performed in three steps. In the first step we will examine the current state of the public-private partnership implementation in the reconstruction of public lighting in municipalities in the Slovak Republic. First, we analyse the reconstruction of public lighting especially in municipalities in the Slovak Republic in accordance with nine groups of criteria:

1. average investment, quartiles of investment, maximum investment, minimum investment, average investment per capita,
2. average electrical power of the public lighting before reconstruction in kW, the quartiles of the electrical power of the public lighting before reconstruction in kW, the maximum and minimum electrical power of the public lighting before reconstruction in kW,
3. average electrical power of the public lighting after reconstruction in kW, the quartiles of the electrical power of the public lighting after reconstruction in kW, the maximum and minimum electrical power of the public lighting after reconstruction in kW,
4. average investment per kW of installed electric power, quartiles of investment per kW of installed electric power, maximum and minimum investment per kW of installed electric power,
5. average electricity savings in MWh and as a percentage, quartiles of electricity savings in MWh, maximum and minimum electricity savings in MWh and as a percentage,
6. average savings in EUR, quartiles of savings in EUR, maximum and minimum savings in EUR, average savings in EUR per capita,
7. average savings in EUR per kW of installed electrical power, quartiles saving in EUR per kW of installed electrical power, maximum and minimum savings in EUR per kW of installed electric power,
8. average net present value,
9. average value of the internal rate of return.

Net Present Value (NPV) is used to assess the return on investment projects. It expresses the total current (discounted) value of the cash flows associated with the investment project.

$$NPV = \sum_{t=0}^N \frac{CF_t}{(1+i)^t} \quad (1)$$

where: CF<sub>t</sub> – project cash flow in the year t

i – discount rate

t – evaluated period (from 0 to n years)

N – lifetime (evaluation) of the project

Internal rate of return (IRR) is the rate of return on the investment project over its lifetime.

$$NPV = \sum_{t=0}^N \frac{CF_t}{(1+i)^t} = 0 \quad (2)$$

where applicable: IRR = i

where: CF<sub>t</sub> – project cash flow in the year t

t - evaluated period (from 0 to n years)

N – lifetime (evaluation) of the project

Consequently, we will evaluate the reconstruction of public lighting in the examined municipalities in the Slovak Republic through a net present value indicator.

We are looking at two variants:

- **Variant V1** – the municipality implements the reconstruction of public lighting in an internal manner (traditional public procurement). The local government implements the reconstruction of public lighting internally and is responsible for it. The reconstruction is fully financed by a bank loan. The interest rate is 3%. The maturity of the loan is 15 years (the typical time for this type of project). The technical life of the project is 25 years. The benefits of V1 are savings in electricity and the cost of operating and maintaining public lighting. The saved electricity in technical units (MWh) is converted by the price of electricity at time T0 with a 2% increase in prices over the following years. The cost savings for the operation and maintenance of public lighting are calculated as the difference between the real costs of operating and maintaining public lighting and the estimated costs of operating and maintaining the new LED public lighting. The cost of the V1 option is the amount of the annual debt service (loan principal and interest). We use a discount rate of 5% when calculating the present value of benefits, costs and net benefits
- **Variant V2** – the municipality implements the reconstruction of public lighting externally (through a public-private partnership). The local government implements the reconstruction of public lighting externally through a public-private partnership. The private partner is responsible for the reconstruction of public lighting and finances it in full. For 15 years, the local government pays the private partner, as a consideration for the realization of the public lighting reconstruction and its subsequent operation and maintenance, 95% of the annual costs for the electricity, the operation and maintenance of the original public lighting. For a further 10 years at the end of this period, the local government fully benefits from the reconstruction of public lighting identically the same as the V1 option.

The benefits of V2 are, from the point of view of local government, savings of electricity and the cost of operating and maintaining the original public lighting to an amount of 5%. The saved electricity in technical units (MWh) is converted by the price of electricity at time T0 with a 2% increase in prices over the following years. The cost savings for the operation and maintenance of public lighting are calculated as the difference between the real costs of operating and maintaining public lighting and the estimated costs of operating and maintaining the new LED public lighting. When using the V2, local government does not generate costs, the public lighting reconstruction through public-private partnerships saves the original cost of electricity and the operation and maintenance of public lighting. We use a discount rate of 5% when calculating the present value of benefits and net benefits.

The result of the comparison shows a more efficient variant, which has a greater economic value for the municipality. A suitable variant meets the requirement of NPV max.

The net present value indicator is calculated from data from public lighting energy audits of municipalities in the Slovak Republic which reconstructed public lighting. Energy audits were processed before reconstruction in line with requirements of Act 321/2014 Coll. on energy efficiency [1]. The reconstructions were based on energy audits where original bulbs were replaced by new LEDs. The condition for municipal incorporation into the research sample is not the use of public-private partnership in the reconstruction of public lighting. The research sample consists of 29 municipalities.

### 3 Results and Discussion

The analysis of public lighting reconstruction in the evaluated municipalities in the Slovak Republic showed that the municipalities invested an average of 373, 849.24 EUR in the reconstruction of public lighting. The average investment per inhabitant of the municipalities was 40.13 EUR. The average electric power consumption of public lighting lamps before the reconstruction was 79.18 kW. After reconstruction, the average electrical power of public lighting lamps was 24.33 kW (less by 54.85 kW, 69.27%). The average investment per kW of installed electrical power in the surveyed municipalities was 18, 585.48 EUR.

Reconstruction of public lighting has resulted in electricity savings of 65.78% in the surveyed municipalities, which is 5, 090.18 MWh. Total savings including electricity savings and cost savings for the operation and maintenance of public lighting in the surveyed municipalities are on average 34, 093,16 EUR. The average total savings per inhabitant in municipalities is 3.92 EUR. The average total savings per kW of installed electrical power in the surveyed municipalities is 833.64 EUR. The average net present value is 77 420 EUR. The average value of the internal rate of return is 6.53%.

The following table shows the comparison of the net present value of implemented public lighting reconstruction projects in the surveyed municipalities in the two evaluation variants - traditional public procurement (V1) and public-private partnership (V2).

Sixteen surveyed municipalities implemented the reconstruction of public lighting internally through the traditional public procurement and 13 externally through the public-private partnership. The comparison of the net present values confirmed the correctness of the decision in 9 cases where municipalities implemented reconstruction internally (Bošany, Gbely, Lozorno, Malacky, Prešov, Štúrovo, Unín, Veľký Meder and Žiar na Hronom). In seven municipalities, it was more convenient to implement a public lighting reconstruction project externally through the public-private partnerships (Bánovce n/ Bebravou, Dolný Kubín, Košice - Kavečany, Michalová, Rajecké Teplice, Ruská Nová Ves and Senec). The result of the comparison confirmed the correctness of the decision in two cases (Dudince and Veľký Lapáš) in municipalities that have implemented the reconstruction of public lighting externally through public-private partnership. In eleven cases (Čadca, Dolný Štál, Hruštín, Choča, Kráľová pri Senci, Liptovský Trnovec, Michal na Ostrove, Sap, Šamorín, Štitáre and Tehla) the municipalities decided on the PPP project incorrectly.

**Table 1. Net present value of public lighting reconstruction projects of surveyed municipalities in the variants of traditional public procurement (V1) and public-private partnership (V2). (Source: Authors)**

Municipality	Variant	Present value of income	Present value of expenses	Net present value	Variant rating
Bánovce n/ Bebravou	V1	1,266,157	882,585	383,572	2.
	V2	458,718	-	458,718	1.
Bošany	V1	603,928	402,041	201,887	1.
	V2	19,6089	-	196,089	2.
Čadca	V1	4,198,727	2,426,189	1,772,538	1.
	V2	1,473,385	-	1,473,385	2.
Dolný Kubín	V1	234,457	258,558	-24,100	2.
	V2	84,805	-	84,805	1.
Dolný Štál	V1	162,892	65,825	97,068	1.
	V2	55,793	-	55,793	2.
Dudince	V1	169,919	182,404	-12,484	2.
	V2	62,268	-	62,268	1.
Gbely	V1	486,207	173,220	312,987	1.
	V2	176,712	-	176,712	2.
Hruštín	V1	669,963	213,032	456,931	1.
	V2	212,257	-	212,257	2.
Choča	V1	98,326	51,141	47,185	1.
	V2	36,041	-	36,041	2.
Košice Kavečany	V1	156,533	138,301	18,232	2.
	V2	55,458	-	55,458	1.
Kráľová Pri Senci	V1	622,748	115,708	507,040	1.

	V2	198,972	-	198,972	2.
Liptovský					
Trnovec	V1	207,009	49,629	157,380	1.
	V2	70,001	-	70,001	2.
Lozorno	V1	285,639	133,343	152,296	1.
	V2	149,136	-	149,136	2.
Malecky	V1	248,030	140,771	107,259	1.
	V2	89,325	-	89,325	2.
Michal					
na Ostrove	V1	292,379	65,929	226,450	1.
	V2	96,720	-	96,720	2.
Michalová	V1	102,698	73,885	28,813	2.
	V2	38,050	-	38,050	1.
Prešov	V1	764,351	446,917	317,435	1.
	V2	294,660	-	294,660	2.
Rajecké Teplice	V1	86,233	86,100	133	2.
	V2	31,738	-	31,738	1.
Ruská					
Nová Ves	V1	83,311	108,650	- 25,338	2.
	V2	89,568	-	89,568	1.
Sap	V1	151,717	37,123	114,594	1.
	V2	53,013	-	53,013	2.
Senec	V1	1,584,126	1,053,191	530,935	2.
	V2	574,169	-	574,169	1.
Šamorín	V1	1,369,565	454,923	914,641	1.
	V2	493,163	-	493,163	2.
Štúrovo	V1	1,567,089	956,663	610,426	1.
	V2	570,438	-	570,438	2.
Štitáre	V1	65,622	38,489	27,173	1.
	V2	26,047	-	26,047	2.
Tehla	V1	169,922	40,980	128,942	1.
	V2	58,585	-	58,585	2.
Unín	V1	236,722	64,649	172,073	1.
	V2	80,654	-	80,654	2.
Veľký Lapáš	V1	6,191	26,402	- 20,211	2.
	V2	7,853	-	7,853	1.
Veľký Meder	V1	1,222,293	333,195	889,098	1.
	V2	435,821	-	435,821	2.
Žiar nad Hronom	V1	777,566	475,772	301,794	1.
	V2	300,352	-	300,352	2.

#### 4 Conclusion

Based on the knowledge of needs, the management of each organization looks for alternative solutions, evaluates possible alternatives (in the case of a public organisation responsible for public infrastructure these are possible forms of infrastructure construction and operation - PPPs versus traditional procurement) and decides on the implementation of alternatives that are the most suitable for achieving the strategic (operational) objectives of the organization (fulfilment of the public interest in the provision of public services in correspondence to the extent and quality of the public needs).

Ex ante assessment of possible alternatives / forms of public infrastructure construction is a necessity in this respect. The ex-ante evaluation involves proper financial decision-making based on the relevant information. An important basis is the internal information (calculations, records, reporting, statistics) provided by the information (financial) system. The organization should inevitably monitor cash flow for financial decision making, particularly when deciding on solvency and liquidity issues and on all types of operational and investment decisions. The quality of information for financial decision-making in the public sector is low, which is one of the reasons for unsystematic decision-making on possible alternatives to the construction and operation of public facilities and the absence of ex-ante evaluation of these alternatives. As part of the ex-ante evaluation, PPP projects require more demanding evaluation methods. One of them is the comparison of PPP with the so-called reference method of providing public service in an internal / traditional manner.

From the analysed experience in the Slovak municipalities it is possible to summarize that ex-ante evaluation fails mainly in cases where: its importance is not properly understood; there is insufficient data available; conflict of interest will arise in the evaluation process; the policy of underestimation and overestimation still prevails in the public institution; and inconsistency of the policy framework occurs. The analysis focused on public lighting reconstruction projects in 29 Slovak municipalities. Sixteen surveyed municipalities implemented the reconstruction of public lighting internally through the traditional public procurement and thirteen externally through the public-private partnership. The analysis has compared the net present value of traditional public procurement and public-private partnership of implemented public lighting reconstruction projects. The comparison of the net present values confirmed the correctness of the decision in 9 cases where the municipalities implemented reconstruction internally. In 7 municipalities, it was more convenient to implement a public lighting reconstruction project externally through the public-private partnerships. The result of the comparison confirmed the correctness of the decision in two municipalities that have implemented the reconstruction of public lighting externally through public-private partnership. In 11 municipalities decided for the PPP project incorrectly. The results of the analysis confirm the problems in ex-ante of possible alternatives to the construction of public infrastructure in Slovak municipalities.

For successful implementation of public infrastructure construction and operation evaluation several recommendations could be proposed: 1. Existence of strong external and internal impulses: the need to significantly improve the performance of the public institution; internal and external willingness to make changes in a public institution; a demonstrable diversity in the performance of public institutions. 2. Creating the suitable conditions, i.e. understanding the benefits of evaluating the forms of public service provision, infrastructure construction and operation; allocating the necessary resources and a well-organised evaluation process; honest support and convincing commitment of the public institution management; the proper choice of the evaluated object; selecting suitable people to lead the evaluation process - teamwork where team members must be sufficiently trained to carry out the evaluation process and follow the agreed and proven way of conducting the evaluation process which in turn requires the need to develop manuals and evaluation procedures that public institutions could rely on in the evaluation process. To facilitate further progress in this area, it is possible to propose:

I. Presenting to and achieving a wider acceptance of this methodology by public institutions. Implementation of this step requires the presentation of decision-making methods on the forms of public facility construction and operation by drawing up the manuals on the principles and also in applying the process of evaluating the forms of public-private partnership project implementation in the field of infrastructure for public institutions as providers of the statutory scope of public services.

II. Creating the conditions for obtaining the required data inside the public institution: This step involves implementing measures within public administrations to acquire the required data to perform the evaluation process.

III. Creating a system that would concentrate and present data from the participants in the evaluation process: This step should create an environment that will make it possible to present

both successes and failures in the attempts to improve performance in a useful way. An information system that would aggregate data from participating organizations should include: a central database of indicator values that would aggregate data from public institutions (through a computer network); an application layer that would convert the values of individual indicators into the required reports to identify "best practice"; and a presentation layer for easy data manipulation and configuration. Regular presentation of processed data and discussion of evaluation results should increase the value of the results obtained through mutual exchange and transfer of the best experience of public institutions interested in co-operation in the application of evaluation procedures to achieve a higher level of quality in the public services provision.

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# Consumer Preferences and Willingness to Pay for Public Goods

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## Abstract

The value to society of charitable giving and philanthropy is recognised and growing in Europe and even more and more important in current troubled times ([36]). There are many factors, which affect the capability and willingness of people to pay for public goods voluntarily. The aim of the paper is to research factors of willingness to pay for public goods in the theoretical context of public goods and solve the issue of consumer acceptance of charging such goods. The data gathering procedure in the primary research is an experimental survey. The experimental survey is divided into three parts; part one contains mathematical issues, the second part of the survey focuses on ways of "collecting" funds and the motives of the willingness of individuals voluntarily pay to public goods. The last section contains demographic issues. The outcomes of our research will be useful for public sector organisations in the issue of public service charging also for non-governmental organisations in the question of financial resources gaining.

*Keywords: Consumer; Preferences; Public goods; Referendum; Willingness to pay*

JEL Classification: C91, D12, D64, H41

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## 1 Introduction

One of the reasons of popularity of public goods provision experiments via the voluntary contribution mechanism is a study of individuals behaviour. One of the primary findings in this model is that subjects contribute a considerable amount of their initial holdings to the provision of a public good even when no contribution is the dominant strategy (*homo oeconomicus*) ([32]). Individuals often have non-standard preferences ([33]), mistaken and systematic prejudices ([13]). The possibility to demonstrate the conflict between the interest of individuals and welfare is not only interesting for economists but also for professionals from other fields such as psychology, sociology or political science ([35]). The traditional model of the economic experiment is enhanced, in the meantime not considering motives of voluntary contribution, such as altruism and warm-glow effect ([2],[26]), and new mechanisms for the provision of public goods such as charitable lotteries, auctions, thresholds, and crowdfunding ([1],[15],[14],[22]). Economic experiments investigating the voluntary contribution mechanism (VCM) allow subsequent practical application of the results in practice. If one of the proposed fundraising tools achieves higher efficiency in laboratory conditions than others there is a realistic chance that this will be also true in reality/real conditions. Despite the limitations of economic experiments (unrepresentative choice of the test subject, simplification of the model situation and remuneration method), economic experiments with public goods can lead to the verification of the selected problems not only in a laboratory experiment but also in a field experiment ([35]).

Regardless of whether this is a field experiment or a laboratory experiment, some factors influence the behaviour of the experimental participants not only stochastically but also systematically ([27]). In general, factors that positively or negatively affect the willingness of individuals to pay for public goods can be divided into backgrounds (external), systemic (internal) and institutional factors ([14],[18],[21],[34],[27])

Background (external) factors ([21], [27], [35]) such as the number of participants or the size of the group ([30]), the composition of the group ([1]), the gender of the participants ([37]) and the marginal per capita return ([25]) define the background in which the experiment is conducted, and shall include, in particular, the objective characteristics, familiar to all the participants of the experiment. By contrast, systemic (internal) factors are linked to specific

individuals and are given by his social position or life experience ([35]). Systemic factors such as prejudices ([28]), identification with a group ([31]), the threat of exclusion of an individual from a group ([8]), altruism ([26]), moral principles ([4]), effort, and risk aversion ([9]) are opposed to background factors, worse measurable and controllable ([27]). It is difficult to determine the degree of their impact on the behaviour of the participants of the experiment ([38]).

The third group of factors are institutional factors. Institutional factors represent different ways of providing public goods such as punishment of free rider ([7], [8]), crowdfunding ([12], [22]), charity lotteries ([11]) and auction ([5]). In this study we try to investigate some of these factors affecting willingness to pay for education as for public good.

## 2 Material and Methods

The aim of the paper is to research factors of willingness to pay for public goods in the theoretical context and to solve the issue of consumer acceptance of charging for such goods.

We chose education as a public good in our survey.

Research assumption focused on factors affecting willingness to pay for the education as for public good. The main research assumption: several factors affect the rate of voluntary contribution to public goods.

The research assumption no. 1: We assume that the decision of individuals to voluntarily pay for public goods is dependent on the background (gender, age, education, economic activity, number of children, number of dependent children, average net monthly earnings) in which individuals make a decision.

The research assumption no. 2: We assume that the choice of individuals to voluntarily pay for public goods is dependent on the individual's social position (warm-glow effect, identifying an individual with a group).

Based on this, we have further investigated the influence of (1) background, external factors (gender, net monthly earnings, education, economic activity, number of dependent children in the household, family background), influence (2.) of systemic, internal factors (risk aversion, warm-glow effect, or feelings of satisfaction from good affiliation and identification with the group) to the willingness of individuals to pay for education.

When exploring these factors, we were inspired by the Berlinski and Busso experiments ([6]). The reason why we have chosen their survey is that the quality of the education system in Slovakia is similar to that in Mexico. Their survey experiment ([6]) carried out on a sample of 1,000 Argentinian households. This study is one of the most extensive surveys examining education as a public good, in terms of the number of respondents involved. They asked survey respondents to consider a hypothetical situation (vignette) designed to elicit the households' willingness to pay for the improvement of the performance of public school students in international educational assessments ([6]). Households were presented with a sequence of bids they could accept or reject. Their survey experiment was in the form of the questionnaire. They asked respondents about the composition of their household, the number of children in the household, type of school their children attend and socioeconomic status ([6]). They have confirmed that households are willing to voluntarily pay for education, nevertheless it does not depend on the number of dependent children in the household, but especially on whether their children attend public or private schools and from the amount of their net earnings.

We also implemented a survey experiment. A frequent problem of experiments is a non-representative selected sample that does not allow generalisation of the results achieved. The experiments usually focus on testing the responses and behaviours of university students. The reason for the use of students is the low cost of setting up the test group and the assumption of greater interest and motivation for testing by students ([35]). In contrast, the advantage of the survey experiment is an experiment that is administered to a representative population sample ([19],[29]). A survey experiment involves the (random) manipulation of one or more features of the survey instrument (vignette), such as the phrasing of question prompts (voluntary and involuntary payment), the ordering of response categories, or the informational content of a

hypothetical scenario (highlighting the positive effects of implementing the project). Although survey experiments are extremely useful tools, they are not a panacea for the major challenges to causal inference ([10]). This is because manipulation of one feature of a scenario will generally change subjects' beliefs about other features of the scenario ([10]).

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

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

The second part of the survey was the "referendum" (Pontis Foundation Project). In the beginning, we introduced the situation in Slovakia and the concrete project thanks to which it could have been possible to improve the quality of education in Slovakia. Subsequently, we asked the respondents whether or not they are willing to voluntarily pay for a specific project. If they answered "yes" we continued the question of what motivated them to pay for this project and how much they would be willing to pay. If they answered "no" we asked them about their motives. In the next part of the experiment, we wanted to determine whether the decision of individuals to contribute to a particular project was due to state's regulation.

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

The basic sample, as a set of statistics, in this case, consists of residents of Slovak republic who meet the required characteristics. The basic sample is very extensive, as it is comprised of 4,429,608.5 inhabitants; we, therefore, determined the selection sample that comprised of 181 citizens from Slovak republic. We obtained the selected sample using quota sampling according to the following statistical attributes: gender, age group and educational attainment, whereby its structure corresponds to the basic sample. We translated the obtained data using numerical codes and was furthermore statistically processed using the following statistical methods:

- Chi-square test (tests the representativeness of the selected sample),
- Multiple response analysis, Friedman and Wilcoxon non-parametric test (identification of incentives of consumers in the consumption of public goods),
- Spearman correlation coefficient and Cramer's V (verification of dependence of the characteristics of the consumers' gender, age, level of education, the average net monthly earnings, number of dependent children, the type of school that children attend, the number of members of the household).

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

**Table 1. The selected sample for measuring willingness to pay for public goods. (Source: Authors)**

	Classification symbol	Selected sample %	Basic sample (%)
Gender	Men	48.62	48.78
	Woman	51.38	51.22
Age group	18-24	10.50	10.34
	25-34	18.78	18.85
	35-44	19.89	19.92
	45-54	16.57	16.26
	55+	34.25	34.63
	Elementary	18.23	18.39
Education	Secondary without final exams	29.28	28.29
	Secondary with final exams	35.36	36.31
	Tertiary	17.13	17.10
Net earnings	To € 330	9.44	-
	€ 331 – 500	25.00	-
	€ 501 – 700 EU	17.78	-
	€ 700 – 1,000	13.89	-
	More than € 1,000	12.22	-

Classification symbol	Selected sample %	Basic sample (%)	
	I'm not interested in answering	21.67	-
	One	8.84	-
	Two	28.73	-
The number of members of the household	Three	18.23	-
	Four	27.62	-
	Five and more	16.57	-
	No one	46.96	-
	One	23.76	-
Number of dependent children	Two	21.55	-
	Three	2.76	-
	Four	3.87	-
	Five and more	1.10	-

### 3 Results and Discussion

We have set the main research assumption and supportive research assumptions in work, which we will try to verify in the next part.

The main research assumption: some factors affect the rate of voluntary contribution to public goods.

The research assumption no. 1: We assume that the decision of individuals to voluntarily pay for public goods is dependent on the background (gender, age, education, economic activity, number of dependent children, average net monthly earnings).

The research assumption no. 2: We assume that the choice of individuals to voluntarily pay for public goods is dependent on the individual's social position (warm-glow effect, identifying an individual with a group).

We used the chi-square test to verify the selectivity of the sample in relation to the base file. We found that the selected sample is representative of all sorting characters, e. g. gender, age category and the highest achieved education (p-values 0.002, 0.023, 0.112). The results found in the survey can be generalised to all inhabitants of the Slovak Republic.

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

We examined that there is a relationship between the characteristics of individuals (gender, age category, the highest obtained education, economic activity, earnings, number of members in household and the number of dependent children) and their interest to support the project in an analysis of the factors affecting the willingness of individuals to voluntarily pay for public goods. The results are interesting from the point of view of the relevant organisation of fundraising activities, which would get closer to Pareto efficiency, respectively answer the question "how is it necessary to change the way funds are raised from the contributors to increase their contribution?". In the case of dependency factors, it is necessary to stimulate, respectively set experiment parameters to act to increase the willingness of individuals to pay for the selected project. In our survey, we have stimulated the willingness of individuals to pay by highlighting positive impacts on the society by implementing the project.

We did not confirm the dependency between gender and willingness of individuals to voluntary pay for education (p-value 0.628, 0.659), which also corresponds with the results of some economic experiments ([16], [21], [38]). It also turns out that in our experiment women are less interested in voluntarily paying to the Pontis Foundation project than men (p-value 0.022;  $r_s = -0.275$ ).

We have confirmed a weak direct dependence in the case of the age category. The higher the age of group members, the higher the amount of the voluntary contribution to the project was (p-value 0.015,  $r_s = 0.181$ ).

Spearman's correlation coefficient confirms the weak indirect dependence between the highest educational attainment and the willingness of individuals to voluntarily pay to the Pontis Foundation's "Generation 3.0" project. - change in education is already happening "(p-value 0.012,  $r_s = -0.186$ ). Respondents with higher education were willing to pay more.

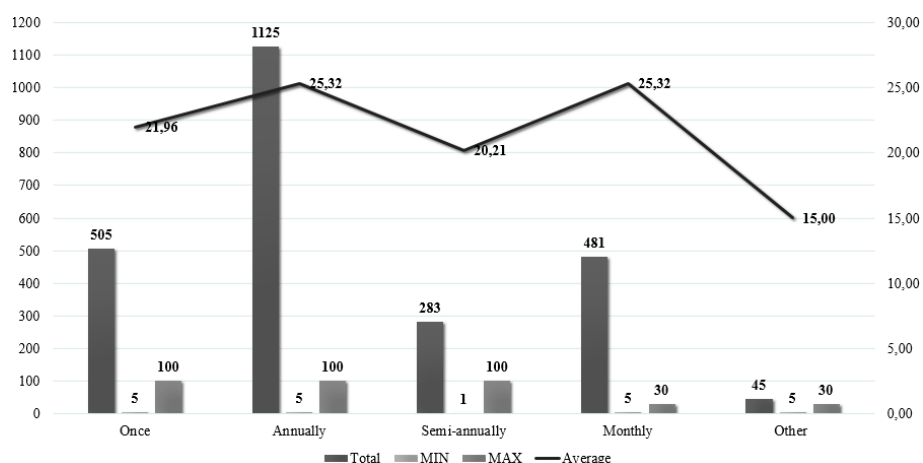
We use Cramer's V to confirm dependence resulting from respondents' answers (0.05 level). There is a dependence between the economic activity of individuals and willingness to pay to the Pontis Foundation "Generation 3.0. - change in education is already happening" (p-value 0.039,  $C_v = 0.255$ ).

Berlinski and Busso ([6]), in their survey experiment focused on whether the number of dependent children in the household affected the willingness of individuals (households) to pay for education. By using Spearman's correlation coefficient and Cramer's V (p-values of 0.458, 0.109) we have confirmed that there is no dependence between the number of dependent children in the household and willingness to pay to education projects

In our survey, respondents only contributed with hypothetical money, so it remains questionable whether their contributions would be "more generous" if they were working with real money.

The second part of the survey was a referendum. In this section, we presented the Pontis Foundation project "Generation 3.0. - 61.88 % of the respondents decided to pay, of whom 21.54% would be willing to pay once at a given level of study (once in primary, once in secondary and once in college), 47.32 % would be willing to pay annually, 12.50 % would be willing to pay semi-annually, 16.96% would be willing to pay monthly and 2.68 % would be willing to pay in a different way (Figure 1). Spearman's correlation coefficient confirms the strong direct dependence between the contribution interval and the total amount that respondents were willing to pay to the Pontis Foundation project. If the interval was shorter the amount that respondents were willing to pay was higher (p-value 0.000;  $r_s = 0.703$ ).

**Figure 1 The amount of contributions to the Pontis Foundation "Generation 3.0. - Change in education is already happening" according to the defined contribution intervals. (Source: Authors)**



By using Friedman and Wilcoxon's nonparametric test, we observed that the main reason why individuals chose to contribute to the Pontis Foundation project was a sense of satisfaction of promoting a good thing (p-value 0.101), improving the future of their children (p-value 0.579) and solving the problem by the state (p-value 0.758). On the other hand, the reasons why individuals would not support the project is that the project does not interest them (p-value 0.257) or they have mistrust in such projects (p-value 0.683).

In our survey, we as well wanted to discover whether the willingness to pay for education would change if the state had directly ordered an individual to pay a certain amount of money for the education for five years. Spearman's correlation coefficient confirms the strong indirect dependence between the willingness of individuals to pay for education if ordered by the state and the amount of the education allowance (p-value 0.000;  $r_s = -0.862$ ). In this case, only 24.31% of the respondents were willing to voluntarily pay to the project, with the total amount of contributions collected being € 1 007 with an average contribution of € 6.43. The maximum amount that individuals would be willing to contribute was € 100 and a minimum of € 1.

Masclat et al. ([28]) point out that the use of compulsion, in the form of sanctions, is advantageous only if the degree of cooperation, the amount of individual contributions is low. Otherwise, it is preferable to use non-financial information sanctions ([2]) such as the social

exclusion of an individual ([14]), which ultimately lead to a higher degree of co-operation ([14]) and higher voluntary contribution ([28]). Social pressure is thus a major factor influencing an individual's behaviour, resulting in the manifestation of his / her real preferences, though not necessarily to fully extent ([13]).

By using Friedman and Wilcoxon's nonparametric test, we observed the reasons why individuals decided not to pay in case of state's regulations. Individuals do not see why they should be commanded by the state (p-value 0.000), they also do not think they should do the "work" of the state (p-value 0.827) or have not taken the project themselves and therefore decided not to pay (p-value 0.639). Despite the fact that the state has ordered them to contribute, respondents would pay due to the feeling of satisfaction from the promotion of good things (p-value of 0.239), the state's systematic approach to problem-solving in education (p-value 0.670), the contribution of the family and friends (p-value 1,000), and interest in a project that seeks to address the current problem in Slovakia (p-value of 0.564)

#### 4 Conclusion

The aim of the paper is to research factors of willingness to pay for public goods in the theoretical context of public goods and solve the issue of consumer acceptance of charging such goods.

For the public good, on which we conducted a survey, we set up education. Based on this, we have further investigated the influence of (1) background, external factors, such as gender, net monthly earnings, education, economic activity, number of dependent children in the household, family background, influence (2) of systemic, internal factors, such as warm-glow effect, or feelings of satisfaction from right affiliation and identification with the group to the willingness of individuals to voluntarily pay for education.

We found that the age group (p-value 0.015,  $r_s = 0.181$ ), the highest achieved education (p-value 0.012,  $r_s = -0.186$ ), economic activity (p-value 0.039,  $C_v = 0.255$ ) and the number of household members, family background (p-value 0.037,  $C_v = 0.229$ ) affect the willingness of individuals to voluntarily pay for education. As we have confirmed our dependence on most of questions, we consider this assumption (research assumption 1) to be confirmed.

The second group of factors is because they are systemic factors, internal, worse measurable. At work, we tried to identify a few themes that could affect individuals and their decision on whether or not they would pay for selected projects. We have detected warm-glow effect, in the form of a positive feelings of satisfying the good cause, which had a moderate impact on willingness to voluntarily pay for the projects (p-value 0.007, 0.000,  $CV = 0.341$ ). The second possible factor we were able to identify was the identification with the group. If the project was presented as a solution and improvement of the current situation in the society (in Slovakia), there was a willingness to pay for the project (p-values 0.000, 0.000). We consider research assumption no. 2 to be confirmed.

The results of our research correspond to the results of studies conducted up to now (background factors ([5], [7], [16], [21], [24], [37]), willingness to pay for education ([6]), enforcing individuals ([8], [20], [28]), warm-glow effect ([3], [21]) and highlighting of positive effects ([2], [6], [17]).

According to Dolan et al. ([14] **Error! Reference source not found.**) this includes the exploration of factors influencing individuals' behaviour towards potentially powerful tools that states, professionals and communities can use to address social issues (obesity, crime, environmental sustainability, etc.). There is uncertainty about their duration, there is also uncertainty about their action, along with other factors, as these factors act under certain circumstances. Furthermore the effect of factors on one population group will be the same as that of the other group ([14]). Whether it will change depending, for example, from the sex ([26]), to education ([6]), to group size ([30]), and to the extent to which states, professionals and communities should apply these factors to decision-making process ([14]).

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# Bureaucratic Autonomy vs. Political Leadership: Relationship within Local Government

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## Abstract

Can bureaucrats replace politicians in city leadership? Do they bring benefits into politics or are they a potential threat? This paper analyses the relationship between politics and bureaucracies and creates, based on own original criteria, a systematization of this relationship in areas that most influence policy-making. The paper then derives basic parameters of bureaucratic autonomy and finds that among the negative consequences of the absence of political leadership are mainly the pluralization of bureaucrats, differing priorities, bargaining and loss of accountability. Under optimal conditions however, bureaucratic autonomy guarantees complex problem-solving and reliable long-term public policy solutions. Today, bureaucratic autonomy is a natural phenomenon in Scandinavia or in the United States, where politicians and bureaucrats are on equal footing and share their powers. On the other hand, countries such as the Czech Republic are still lagging behind. Decentralization has become a trend only recently, due to the different social, cultural and political development in this region. The systematization created in this paper can be used to define cases of bureaucratic autonomy and to identify its effects on the functioning of cities and municipalities.

*Keywords: political oversight; bureaucratic autonomy; local government*

JEL Classification: H1

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## 1 Introduction

Since the second half of the 20<sup>th</sup> century throughout the levels of governance and political systems in Europe and the United States of America, politicians have been striving to build bureaucracies, which would be able to take over the burden of administrative routine and implement political decisions mechanically. Today, whether it is a state bureaucracy, which employs over several million bureaucrats in the U.S., or a handful of bureaucrats at the local administration office in a Polish town, both systems are based on the original idea of Max Weber, who claimed that a bureaucracy should be a "slave of the state" and its function should always be defined by political representatives.[28] Even though academic literature discusses various influences on bureaucracies, ranging from interest group to business organization pressure, the pivotal order of political management is essential in the hierarchy of command. Only after a political order is issued, task assigned and financial and legislative boundaries set, the bureaucratic machinery can start its work. At the same time, however, under optimal conditions, Weber declares that bureaucracy is capable of maximum efficiency and can be the most rational tool of control over people.[15] With this claim, Weber opened the discussion to the concept of bureaucratic autonomy, which comes about when a bureaucracy acts on its own internally agreed on priorities and goals. In general, bureaucratic autonomy is defined as an absence of complete political control of assigned political representatives over the management of bureaucracy.[7]

This article analyses the relationship between politics and bureaucracy at the local level and creates an original systematization, which can be applied as a theoretical framework for further empirical research. The contemporary research on the role of bureaucracies is primarily focused on case studies and comparative case studies. However, a comprehensive and coherent analysis of the relationship between political leadership and bureaucracies is missing. This relationship can either be cooperative, which is labeled as "loose" for the purposes of this article or "tight," where the bureaucracy is subject to political orders. This article introduces (1) a

unique systematization of the politics-bureaucracy relationship and (2) a unique systematization of the consequences of the absence of political leadership on (a) responsibility, (b) competencies, and (c) outputs of the administration. These general criteria, which at the same time help to define positive and negative consequences of bureaucratic autonomy, are based on the reviewed literature about the politics-bureaucracy relationship, which represents the building stone of this article. The relationship can be studied from various perspectives and this article, for simplification of such a complex problem, categorizes literature into historical-geographic perspective, subject-theoretical perspective and applied perspective. The first two dimensions are studying the relationship from a strictly theoretical point of view. The third, however, is different in its real-life applied approach with empirical evidence from liberal democratic countries. Out of the overwhelming amount of academic research, this article chooses precisely the applied perspective for its unique ability to capture most of the current observed forms of relationships between politics and bureaucracy.

The actual systematization is based specifically on the applied relationship between politics and bureaucracy. The underlying analysis then focuses on contemporary knowledge about bureaucracies and public administration in democratic political systems. American and European systems of public administration influence each other, and one can see the same codependence between the state level and local level of the politics-bureaucracy relationship. Even various types of research focused on this topic naturally influence each other and despite the fact that this article studies primarily local bureaucracies, valid and transferrable arguments from researchers studying the state level are also used. The methodology is based on the research of chosen monographs of researchers who specifically focus on bureaucratic autonomy, and/or those, who have significantly influenced the subject. European academia was slower to start with research on bureaucratic autonomy, so the chosen sample of publications from the 1990s until today is focused primarily on the benefits of decentralization, loose cooperation between bureaucrats and politicians and managerial reforms of local administration. American literature goes further into history and the sample from the 1960s until today is more oriented on the control and regulation of bureaucratic autonomy and the division of power between politicians and bureaucrats.

## **2 Dimensions of Politics-Bureaucracy Relationship**

### *2.1 Historical-Geographic Perspective*

The origins of research on bureaucracies arise from the political, economic and social need to make day-to-day functioning of the government more efficient and effective. From the historical-geographic point of view, the concept of bureaucracy has evolved many times and is reflected in many scientific fields. A centralized and trained administrative system of territorial units has existed in Prussia as early as the 18<sup>th</sup> century. This system, which was a great inspiration to Weber, was represented by effective and efficient centralized bureaucracies. Rules and procedures were codified and the decision-making mechanism was based on the principal-agent relationship, which is characterized by consistent overview of the process of delegating political orders to the administration. [10]

Obedience of the bureaucratic machinery was also guaranteed by the hierarchy of bureaucrats, who were employed based on rank and political or family ties. It was only in the first half of the 20<sup>th</sup> century that the United Kingdom and Germany started hiring bureaucrats through independent personnel agencies. [3] Bureaucracies slowly started changing into service providers, who were kept under scrutiny of the society (the service demanders). [27] However, the original hierarchic conception of bureaucracies started to be criticized in Europe as well as in the U.S. for being too rigid and self-promoting, with outputs based on bargaining, internal conflict and arguing over resources. [19] The battle with the rising bureaucratic autonomy became, for instance, a priority in the presidential campaigns of R. Nixon, G. Wallace, J. Carter and R. Reagan. [24] However, the demonization and critique of bureaucracies had a different

result on both continents. In Europe, bureaucracies after the Second World War have become either political instruments or independent but cooperating and rather submissive partners to politicians. In the U.S. however, bureaucracies have thanks to their power and size become a permanent part of state power and therefore also a partner (and often an enemy) in decision-making. [14]

## *2.2 Subject-Theoretical Perspective*

Within the subject-theoretical dimension, one can categorize the available academic literature into economic, sociological, political science and legislative directions. The economic research focus marked its most influential point at the time of the greatest economic development of the U.S. and Western Europe, during which state budgets assigned increasing sums to bureaucratic expansion. [11] Researchers claimed a direct link between the economic prosperity of a country and the size of its bureaucratic apparatus, which was able to administer a rich variety of social security for all social classes. [6] In contrast with bureaucratic expansion, an opposition of researchers such as Gray, Jenkins and Segworth naturally argued for minimizing administration and implementing budget cuts in bureaucracies. [13]

The sociological debate discusses the complex relationships of actors inside and outside of bureaucracies. Castells or Torgerson describe the important participatory role of politically active individuals and communities. [17] Different norms and values that dominate different social networks can also define the function of bureaucracy. [1] Even communication between interest groups and employees of local administration at the horizontal level can create effective pressure on direct decision-making and the implementation of policies as desired by the community. [8]

From the point of view of political science, the main actors of public policy are politicians and the power of their ideological and political influence, which they can apply on local bureaucratic offices. [16] In most liberal democratic regimes, bureaucracies are gradually getting more involved in (local) government legislation-drafting and decision-making. [2] They are also increasingly able to participate in advancing democratic participation and building an active civil society. [26] Indeed, very few political decisions can be executed without the support of local institutions and their bureaucracies. [29]

From the legislative perspective, the functions of bureaucracy are formed by the legal framework, constitution and codified norms of every country. [5] The law and the constitution naturally limit the competencies of any institution. At the same time with reform in legislation automatically comes a reform of bureaucracy. [12] In these cases, however, there is a high risk that in a volatile political system, the legislative framework will permit submissiveness of a bureaucracy and eventually act against the society, which it is supposed to serve.

## *2.3 Applied Perspective*

Since the 1960s, researchers have been trying to draft such public policy reforms that would increase the effectivity and efficiency of bureaucracies. These reforms were influenced by the historical-geographic perspective as well as the subject-theoretic perspective and typologies. In the number of applied reforms, New Public Management (NPM) seems to be the most successful. NPM was applied in various forms and mutations in continental Europe, Scandinavia, and Great Britain. It was directly applied by many cities and towns with Tilburg city, which trained its bureaucracy according to experiences from the private sector and business management, as the most famous example. NPM is built on neoliberalism and focuses on the modernization of public administration, decentralization and a managerial leadership of bureaucracies – all in the effort to maximize efficiency. [25]

NPM's predecessor was New Public Administration (NPA), which shares its business-efficiency approach to public administration with NPM. However, NPA completely disregards social problems and public interest stemming from cultural and historical background, which is

naturally different for every country. [4] NPM gave rise to many more theories that aim to reorganize or modernize current administrative systems, for example, New Public Service (NPS), or New Public Governance (NPG), which is one of the most modern trends. NPS is a system, which places citizens at the very core of decision-making, with the aim of pursuing public interest. [9] NPG partly reflects NPS but offers a new system, in which politicians and bureaucrats cooperate at several levels within a pluralistic democratic system and share information and financial resources. [21] In contrast with NPM, which focuses on efficiency and production maximization, both NPG and NPS concentrate on the importance of the relationship between organizations and public services of the highest quality. [22]

This extensive academic and applied discussion about the revised and perfected version of NPM was summarized by Osborne and Gaebler into ten principles of an effective and modern system of local administration. The first principle is redefining the role of local self-government from "rowing" to "steering," with the latter preferring goals, strategies and partners over regulation and process management of the former. The second principle is a perfect harmony between the community and self-government, in which public services can be administered by citizens themselves. The third principle is a competitive local self-government, which permits a regulated market competition in public service supply and internal orders of the bureaucracy. The fourth principle is based on the orientation change of local government bureaucracies to focus on goals, flexibility, critical thinking about own procedures, and the courage to implement reforms. The fifth principle is the support and investment into outputs of bureaucratic work with emphasis on performance and efficiency measures. The sixth principle deals with the relationship of self-government with citizens/clients of public administration, whose demands must always be superior to the demands of bureaucracy. The seventh principle is focused on training bureaucrats in economics and market competition in order for them to manage the bureaucracy's budget and gather resources. The eighth principle emphasizes strategic planning and problem-preventing tools in implementing public policies – crisis management and damage control should be used only at last instance. The ninth principle is the much-discussed decentralization and separation from traditional bureaucratic hierarchy by using modern technologies and e-government. The creation and implementation of public policies should be the result of teamwork and transparent organizational structures. Finally, the tenth principle summarizes the essence of NPM and argues for a market-oriented self-government, which uses market mechanisms to solve bureaucratic agenda. [20]

The success of these principles is, however, dependent on answering a key question, which is the willingness of politicians to accept reforms and share their power with the bureaucracy. This has already been pointed out by Pollit a Bouckaert, who argued that most problems of self-government are caused specifically by political obstructions. [23] For reforms to be successfully implemented in local governments, it is thus of primary importance to define the relationship between politics and bureaucracy. This article continues to create an original systematization that defines strategic points in the politics-bureaucracy relationship, in which reforms can be either applied in cooperation or obstructed in internal conflict between politics and bureaucracy over resources and competencies.

### **3 Politics-Bureaucracy Relationship**

The literature of the last, applied perspective is key for the analysis of the politics-bureaucracy relationship, particularly for its focus on power and resource sharing. The following section of this article studies in detail, whether the politics-bureaucracy relationship is loose or tight in areas of (1) responsibility, (2) competencies and (3) outputs. These central criteria are based on the discussed perspectives and typologies, which study bureaucratic autonomy in practice and hence deepen the knowledge and development of this field. From the reviewed literature it is clear that the most significant impact of bureaucratic autonomy can be observed in areas of delegation of responsibility while working on tasks (area of responsibility), using competencies while solving projects (area of competencies), and evaluating outputs and their

impact on the wellbeing of the society (area of outputs). This three-level analysis is the building block of the following systematization, which is introduced in this article for the first time. The systematization further reveals the positive and negative consequences of bureaucratic autonomy in each of the studied areas. The resulting framework, in its basic form, can be applied across levels of governance and cultural, political and social differences, on all liberal democratic countries.

### 3.1 *Three-level Analysis*

The founding principle of the politics-bureaucracy relationship is the delegation of responsibility to tasks resulting from democratic decision-making. Currently, most systems of local administration increasingly resemble NPM systems, which focus on loose bureaucratic management, with more space and autonomy for bureaucrats. The delegation of tasks within a bureaucracy is managed by its own internal hierarchy. In this hierarchy, politicians take the role of mediators, and bureaucrats take the role of executive managers. The bureaucrat-manager is responsible for task solution and can be flexible in reacting to demands of the society without following political orders. The task solution is complex and coordinated horizontally with the use of competent experts, necessary resources, and external specialists if needed. This more or less official cooperation with external actors and horizontal coordination of bureaucrats can become unmanageable as the size of a bureaucracy increases. With the rising number of inter-organizational consultations and reviews, task-solution can become lengthy and inefficient. Even the choice of external partners can be reduced to those, who do not "unnecessarily complicate" the strategy set by the bureaucracy in advance. As specialized tasks multiply, so do the specialized bureaucratic departments. This burdens the organizational and personnel structure of the bureaucratic organization. All of these potential disadvantages of the loose relationship are an argument for a more strict political management.

Bureaucrats can use various ranges of competencies, depending on the type of management in a bureaucracy. If the politics-bureaucracy relationship is loose, the bureaucratic management can use the absence of political authority for its own use, and it can overstep its organizational, legislative and financial boundaries. The bureaucrat-manager, who is responsible for bureaucratic outputs, can use the broad legislative and financial competencies to hire external experts and consultants and cooperate with other organizations and NGOs. Within these networks, the task-solution processes can become more effective and more responsive to the current demands of the community. A modern and progressive bureaucracy can thus freely react to legislative, political and market mechanisms of the real world. However, many negative factors can enter the optimal and efficient use of competencies on the side of the bureaucracy. Researchers point to the variability of relations between a bureaucracy and external actors. Cooperation with "outsiders" necessarily involves calculating with hidden interests and conflicting priorities on both sides. Defenders of the tight politics-bureaucracy relationship therefore argue that tight political management of bureaucracies avoids such abuse of competencies.

Outputs of bureaucratic work and their impact on the community are another important factor in the politics-bureaucracy relationship. Bureaucracies, unrestrained by election periods, have ideal conditions for creating long-term and effective policies. In the case of a loose politics-bureaucracy relationship, the work of a bureaucracy is influenced by inputs of all actors involved in task solution. When effective internal and external channels of cooperation are established, a bureaucracy can react to acute demands of the society and create coherent policies. The range of the shared priorities that are established by comprehensive bureaucratic work is more valuable for the development of the community than short-term political projects, which are often launched only to increase the popularity of the political representative. This model of equilibrium between public demand and bureaucratic supply can, however, be disturbed by some bureaucratic defects. Consultations with interest groups and inter-organizational cooperation can, without regulation and control, deteriorate up to a point where bureaucratic outputs resemble compromises between strategic interests of involved actors rather than

priorities of the community. The fragmentation of a task among all actors can lead to slack-maximization, endless administrative procedures and distant goals. The advocates of a tight politics-bureaucracy relationship thus argue in favor of political management, which prevents unclear and incomplete bureaucratic outputs.

3.2 Systematization

The key elements of the applied dimension are described in *Table 1. Systematization of politics-bureaucracy relationship*. This previously undescribed systematization summarizes, that if the relationship is tight, the delegation of responsibility corresponds with the political hierarchy and rules determined by politicians. The competencies of the bureaucracy respect rigid boundaries and financial resources available to the bureaucracy are regulated by the assigned budget. The politician, being the highest manager of bureaucracy, is the only responsible actor for the process of task-solution as well as goal completion. The outputs of a bureaucracy usually correspond to short-term goals of the dominating political program. However, if the politics-bureaucracy relationship is loose, tasks are delegated within the bureaucratic hierarchy, and task-solution is coordinated horizontally by bureaucrat-managers. Bureaucrats manage their budget, use information freely, accustom the legislative framework to their current agenda and cooperate with whatever external actor or organization they deem appropriate. Hence the outputs of bureaucracy are aimed at long-term solutions and strategic development of the community.

**Table 1. Systematization of politics-bureaucracy relationship**

	<b>Responsibility</b>	<b>Competencies</b>	<b>Outputs</b>
<b>Tight relationship</b>	Political hierarchy	Regulated resources	Short-term goals
	Rules	Political accountability	Political priorities
<b>Loose relationship</b>	Horizontal coordination	Own resource management	Shared outputs
	Bureaucratic hierarchy	Multi-level cooperation	Strategic priorities

Basic parameters of bureaucratic autonomy can be devised from the above-mention table. Among the negative consequences of the absence of political leadership in delegation of responsibility, one can count mainly the pluralization of bureaucrats and departments, which prolongs and complicates task-solution. The chance of conflict over hidden preferences and interests increases with the rising number of autonomous external and internal partners. Outputs of a bureaucracy are then influenced by bargaining on all sides. If projects and tasks remain incomplete or if their completion is severely delayed, the public has a small chance of finding one responsible actor or organization. Under optimal conditions, however, bureaucratic autonomy guarantees complex problem-solving, during which qualified bureaucrats cooperate with politicians, active civil society, and external experts. Inter-organizational partnership and information sharing guarantee those outputs, which are the best possible policies for the current problems of the community. An autonomous bureaucracy can thus become a trustworthy partner for drafting and implementing public policies. This summary is described in *Table 2*, which summarizes the *negative and positive impacts of bureaucratic autonomy*.

**Table 2. Negative and positive impacts of bureaucratic autonomy**

	-	+
<b>Responsibility</b>	Pluralization of units	Complex solutions
	Lengthy problem-solving	Experience sharing
<b>Competencies</b>	Hidden interests	Representation of public interest
	Conflict of priorities	Flexibility when reacting to real issues
<b>Outputs</b>	Pressure of interest groups	Long-term coherent outputs
	Loss of responsibility	Trust of the society

#### 4 Conclusion

This article introduced and clearly divided the broad academic discussion about the influences and relationships between politics and bureaucracies. A unique systematization was introduced, based on the reviewed literature, which revealed that the politics-bureaucracy relationship is either cooperative/loose (enables bureaucratic autonomy) or authoritative/tight (bureaucracy subject to political representation). Further, a systematization of the positive and negative impacts of bureaucratic autonomy was introduced in three levels of (1) delegation of responsibility while working on tasks (area of responsibility), (2) using competencies while solving projects (area of competencies), and (3) evaluating outputs and their impact on the wellbeing of the society (area of outputs). The amount of literature on this topic significantly exceeds the capacity of this article. Further research is necessary for areas of external political pressures on bureaucracies. The fact that bureaucracy is not subject to assigned political representative does not necessarily mean that it is not influenced by politics. Actors, political ideologies, and business interests can vary at each stage of the introduced three-level analysis of delegation, competencies and outputs. Can we equate political pressure with interest group pressure? What is the difference between bureaucratic contact with ruling party politicians and opposition politicians? These questions have already been opened [18] but deeper analysis is needed to disclose the real bureaucratic resistance (or permeability) to external pressures.

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# Politicians' Optimization: The Separating Effect of Electoral Control

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## Abstract

It is puzzling that cross-country studies offer sound evidence of a corruption-curbing effect of democratic elections even though single-country studies show that corrupt politicians may escape electoral punishment and anecdotal evidence of corruption-charged politicians enjoying widespread voter support abounds. This paper provides a resolution through the construction of a consumer-like model of politicians' optimization, in which the representative politician maximizes utility from the consumption of two goods, self-enrichment and election votes, subject to two constraints. The institutional constraint caps the amount of self-enrichment opportunities available. The electoral constraint emerges when the media report on politicians' corrupt behavior and voters take this information into account at the ballot box, forcing politicians to allocate their "trust budgets" to either vote-generating trustworthy behavior or self-enriching untrustworthy behavior. The model makes it clear that electoral control is above all about preventing the pooling of politicians at the highest institutionally attainable level of untrustworthy (corrupt) behavior; not about voters ousting corrupt politicians from office at election time.

*Keywords: corruption, elections; accountability, politicians; trust*

JEL Classification: D72

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## 1 Introduction

Competitive democratic elections are hailed as the embodiment of political accountability: they are the instrument through which citizens motivate and constrain the actions of their representatives. Adserà et al. [1] find that in a sample of over 110 countries, the presence of a well-informed electorate and democratic elections accounts for one-half to two-thirds of the variance in corruption and good governance more generally. Indeed, cross-country empirical studies provide persuasive evidence of the corruption-curbing effect of democratic elections [1] [9] [12]. Yet anecdotal evidence [14] as well as the results of single-country studies are less convincing. Two investigations of the effect of re-election incentives in Brazilian municipalities reach contradictory conclusions: while Ferraz and Finan [7] find that first-term mayors, who can be re-elected, misappropriate 27 % fewer resources than second-term mayors, who are not allowed to run again, Pereira et al. [11] uncover a perverse effect of re-election incentives that is amplified in the presence of weak check-and-balance institutions. In a study of corruption charges on voting behavior in U. S. congressional elections, Welch and Hibbing [13] find that 89.8 % of incumbents charged with corruption run in the next election and 72 % of those running win the post, in spite of an average ten-percentage-point electoral penalty.

Can elections keep politicians' conduct in check even when voters fail to remove corruption-charged politicians from office? And how does one reconcile the corruption-reducing effect of democratic elections from cross-country studies with the much more doubtful national evidence? To answer these questions I develop a model of politicians' behavior that is analogous to the standard microeconomic consumer-choice problem, but which takes into account the particularities of political agency – uncertainty, elections, and social embeddedness. The model posits a utility-maximizing politician who allocates citizens' trust to either trustworthy behavior, which wins election votes, or to untrustworthy behavior, which leads to the politician's material self-enrichment. The key implication is that the effect of electoral control consists not in voters removing

untrustworthy (corrupt) politicians from office but rather in preventing the pooling of politicians with heterogeneous preferences at the highest attainable level of untrustworthy (corrupt) behavior.

There are two prerequisites for effective electoral control: first, voters must possess sufficient and accurate information to be able to identify misbehaving politicians; second, they must act upon this information at the ballot box [1] [8] [10]. Voters may support corrupt politicians if they lack information about their behavior or if they discount allegations of corruption on the grounds of being false, politically-motivated or irrelevant (the *information hypothesis*); alternatively, voters may accept such misconduct in exchange for certain benefits such as the provision of public goods and services, political competence or ideological satisfaction (the *trade-off hypothesis*).

Rewards from holding political office may be financial (salary, perks, increased future income due to higher social capital) or psychological (power, fame, public service, pursuit of own policy views). Politicians' motivations influence the effort they put in while in office [5]. Because current politicians set future rewards, a body of low-quality (high-quality) politicians will likely attract additional low-quality (high-quality) candidates. This gives rise to the possibility of multiple equilibria and path dependence [2] [4]. In addition, low-quality politicians may take advantage of the fact that voters' information about their ability and motivations is imperfect, and attempt to blend in with the high-quality ones by appearing competent, hard-working and honest, while high-quality politicians wish to separate themselves from the low-quality ones [3].

The paper proceeds as follows. Section 2 presents the consumer-like optimization problem of a representative politician, introducing the assumptions behind his utility function and the constraints he faces. Section 3 applies the model to a body of politicians with heterogeneous preferences under different combinations of constraints and provides an answer to how electoral control may remain an effective constraint on politicians' behavior despite voters' failure to remove some untrustworthy (corrupt) representatives from office. Section 4 concludes.

## 2 Material and Methods

### 2.1 Utility function

The representative politician (henceforth "the politician") derives utility from two goods, self-enrichment ( $S$ ) and election votes ( $V$ ). His expected utility function (1) is a weighted sum of his utility from these two goods, with the parameter  $\rho$  capturing the relative importance of self-enrichment (cases where only one of the two goods matters are not considered). "E" stands for "expected" and captures the uncertainty present in the politician's decision-making.

$$U^E = \rho \times U_S^E + (1 - \rho) \times U_V^E; \rho \in (0,1) \quad (1)$$

"Self-enrichment" denotes corruption and perks of office as well as less tangible benefits such as relaxed work ethic. The expected utility function from self-enrichment (2) is the sum of the utility from self-enrichment and the disutility from expected formal punishment. In (2),  $U(S)$  is the (certain) utility from self-enrichment, for which diminishing marginal utility is assumed, and  $P(S) \times prob_{FP}$  is the expected formal punishment, determined by punishment  $P$ , which is increasing in the amount of self-enrichment  $S$ , and the probability of formal punishment  $prob_{FP}$ , which equals zero if the act is not formally punishable. The utility from expected punishment  $U(P(S) \times prob_{FP})$  must be either negative (punishment is an economic bad) or zero (if no formal punishment applies).

$$U_S^E = U(S) + U(P(S) \times prob_{FP}); prob_{FP} \in [0,1] \quad (2)$$

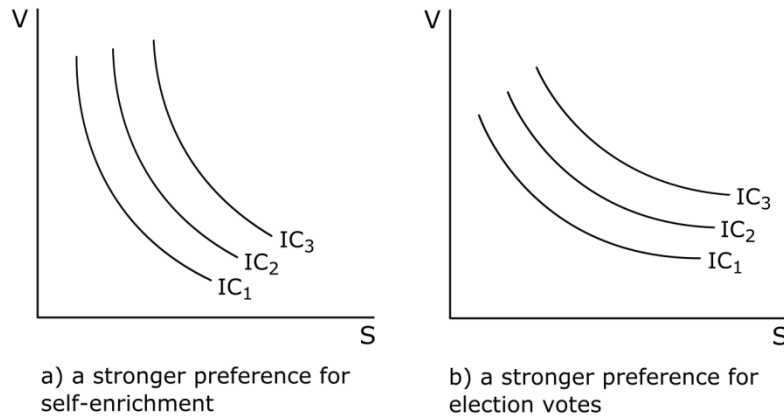
The politician's utility from election votes is likely discontinuous at the decisive vote. However, as the politician cannot identify the decisive vote prior to the election, he adopts a "more a better" heuristic. The expected utility function from election votes (3) is thus continuous (the decisive vote is not known), increasing (each vote brings a positive utility), and concave (initial votes bring higher marginal utility as they are more likely indispensable to electoral victory). These assumptions apply to electoral systems where voters cast votes for individual candidates, even when embedded in party competition (e.g. open-list systems).

$$U_V^E = U^E(V) \quad (3)$$

The presented chain of logic produces the standard well-behaved downward-sloping indifference curves with a diminishing marginal rate of substitution and the slope in equation (4). If the politician prefers self-enrichment to votes (high  $\rho$ ), his indifference curves are steeper, as in panel a) of figure 1, than if he were voter-focused, as is the case in panel b) of figure 1.

$$-MRS = -\frac{\frac{\partial U^E}{\partial S}}{\frac{\partial U^E}{\partial V}} = -\frac{\rho}{(1-\rho)} * \frac{(\frac{\partial U}{\partial S} + \frac{\partial U}{\partial P} * \frac{\partial P}{\partial S} * prob_{FP})}{\frac{\partial U^E}{\partial V}} \quad (4)$$

**Figure 1. The politician's indifference curves (Source: Author)**



## 2.2 Constraints

The politician maximizes the utility from self-enrichment and election votes subject to the institutional constraint and the electoral constraint.

The institutional constraint  $S_{INS}$  represents a cap on available self-enrichment opportunities. High  $S_{INS}$  would characterize a society whose members are generally willing to participate in corrupt activities, where politicians' powers are far-reaching and the bureaucracy is heavily politicized. The institutional constraint (5) requires that the quantity of self-enrichment the politician consumes does not exceed the level of self-enrichment enabled by the institutions in place.

$$S \leq S_{INS} \quad (5)$$

The electoral constraint refers to voters' punishment of the politician's self-enrichment. As in the political accountability literature, voters dislike corruption and conditional upon sufficient information about such acts and their salience amidst other issues withdraw votes from (excessively) self-enriching politicians. This premise gives rise to a trade-off between self-enrichment and votes (i.e. a downward-sloping constraint), but it does not determine its level (i.e. the constraint's intercepts with the axes).

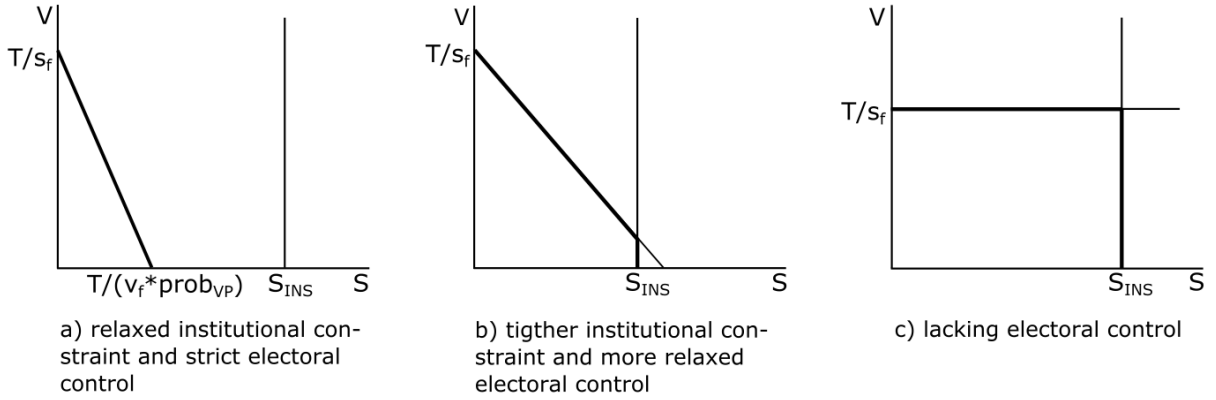
To provide the missing piece, I put the politician on a trust budget. The politician may "spend" voters' trust on election votes or self-enrichment by behaving in a trustworthy or untrustworthy way. Trustworthy acts entail implementing effective policies, advocating citizens' interests, keeping one's promises and abstaining from corruption. These acts demonstrate the politician's competence, benevolence and integrity, and as a result win votes. Untrustworthy acts, by contrast, lead to the politician's self-enrichment at the expense of election votes. Thus, a high- $\rho$  politician with steep indifference curves who places considerable weight on the utility from self-enrichment (see equation 1) would be untrustworthy, while a vote-focused low- $\rho$  politician with flat indifference curves would be considered trustworthy as his preferences motivate him to perform trustworthy acts in pursuit of election votes.

$$v_f \times S \times \text{prob}_{VP} + s_f \times V \leq T; \text{prob}_{VP} \in (0,1) \quad (6)$$

In the electoral constraint (6),  $S$  and  $V$  are the respective goods,  $v_f$  (votes forgone) is the price of corruption,  $s_f$  (self-enrichment forgone) is the price of a vote, and  $\text{prob}_{VP}$  is the probability of voters' punishment (i.e. loss of election votes). Rearranging the terms reveals the slope of the electoral constraint to be  $-\frac{v_f \times \text{prob}_{VP}}{s_f}$ . This may be understood as the "harshness" of electoral control and is subject to a number of factors. The value of  $\text{prob}_{VP}$  depends on how well-informed voters are and the importance of the politician's untrustworthy behavior relative to other issues on which they may vote;  $v_f$  may reflect the composition of the electorate (affluent voters tend to punish corrupt behavior to a lesser extent than poor voters [14]) or the politician's party affiliation (as a result of betrayal aversion [6] the politician may be subject to a particularly harsh trade-off if he is affiliated with a party whose program promises to tackle corruption and other untrustworthy behaviors). Even though the electoral constraint materializes only at election time, the politician may infer its form from popularity polls and the fate of fellow representatives whose untrustworthy behavior has been publicly revealed.

Figure 2 displays examples of feasible sets that may emerge when the institutional and electoral constraints are combined. In panel a), the (strict) electoral constraint alone determines the feasible set, rendering the (relaxed) institutional constraint redundant. In panel b), electoral control is not as strict and the institutional constraint not as relaxed, so the feasible set is a trapezoid with each constraint marking one of its sides. In panel c), the horizontal electoral constraint indicates voters' failure to punish the politician's self-enrichment by withdrawing votes ( $v_f \times \text{prob}_{VP}$  equals zero).

Figure 2. Feasible sets (Source: Author)



### 2.3 Optimality condition

Maximizing the politician's utility function (1) subject to the institutional constraint (5) and electoral constraint (6) yields the optimality condition (7). The politician engages in more untrustworthy behavior and consumes larger amounts of self-enrichment when the price of self-enrichment in terms of votes is low, when the price of election votes in terms of self-enrichment is high, and when the probabilities of formal and electoral punishment are low.

$$\frac{\rho}{(1-\rho)} * \frac{\left(\frac{\partial U}{\partial S} + \frac{\partial U}{\partial P} * \frac{\partial P}{\partial S} * prob_{FP}\right)}{\frac{\partial U^E}{\partial V}} = \frac{v_f * prob_{VP}}{s_f} \text{ for } S \leq S_{INS} \quad (7)$$

## 3 Results and Discussion

Consider two politicians with differing values of  $\rho$ : a trustworthy politician (*tw*) with low  $\rho$  and an untrustworthy politician (*utw*) with high  $\rho$ . I use the two-politician set up to prevent the figures from getting chaotic; however, the logic extends straightforwardly to a continuum of politicians who differ in their relative preferences for self-enrichment and election votes.

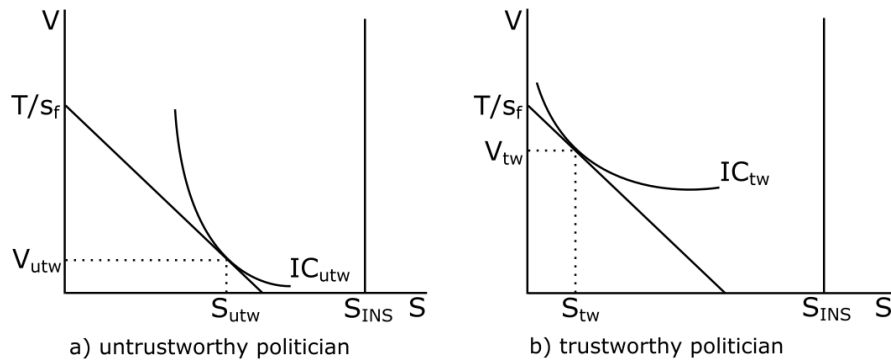
### 3.1 Electoral control in cross-country comparisons

Freedom of the media, freedom and fairness of elections, the salience of politicians' untrustworthy conduct, and the composition of the electorate differ greatly between countries. Hence, so does electoral control.

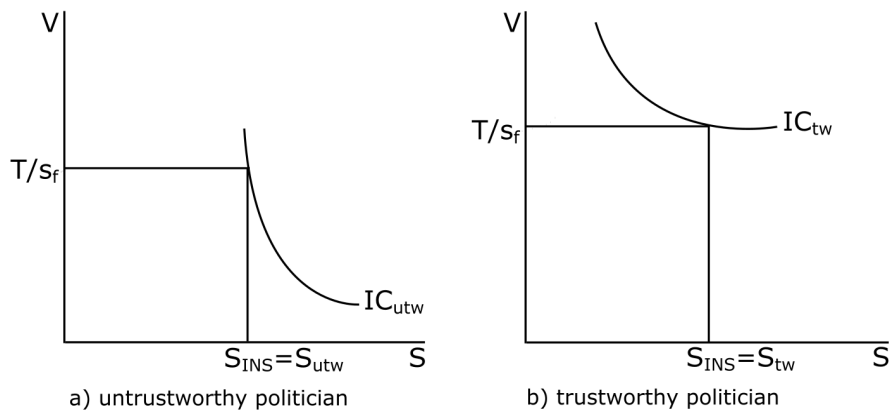
Figure 3 shows a country with working electoral control (i.e. a downward-sloping electoral constraint). Under working electoral control, the optimum bundle of the untrustworthy politician in panel a) contains a high amount of self-enrichment ( $S_{utw}$ ), while the optimum bundle of the trustworthy politician in panel b) contains little self-enrichment ( $S_{tw}$ ). The downward-sloping electoral constraint forces politicians to separate along the outer boundary of the feasible set according to their individual preferences, consuming different combinations of self-enrichment and election votes.

Figure 4 represents a country where electoral control is lacking (i.e. the electoral constraint is horizontal). With no electoral control, the optimum bundles of the untrustworthy and trustworthy politician contain the same amount of self-enrichment. Irrespective of heterogeneous preferences, politicians pool at the highest institutionally attainable level of untrustworthy behavior, all consuming self-enrichment  $S_{INS}$ .

**Figure 3. Politicians' optima under working electoral control (Source: Author)**



**Figure 4. Politicians' optima under lacking electoral control (Source: Author)**



When cross-country studies examine the link between corruption and democratic elections, they are comparing countries in figure 3 with countries in figure 4, i.e. they are comparing scenarios in which politicians pool with those in which they separate (to various degrees).

### 3.2 Electoral control at the single-country level

Single-country studies, however, scrutinize the link between corruption and voters' support within one of the scenarios, not across them. At the national level politicians either pool or separate depending on the form of the electoral constraint. If politicians pool (figure 4), all consuming as much self-enrichment as institutionally possible, voters are left to choose between equally self-enriching politicians and naturally come to base their voting decisions on other criteria. If politicians separate (figure 3), electoral control is in principle effective in constraining politicians' behavior, but may fail in ousting untrustworthy politicians for two reasons. First, if the overall quality of candidates is poor, some untrustworthy ones make the cut: even if the untrustworthy politician wins fewer votes than the trustworthy one, they may suffice. Second, even in societies with well-functioning media voters do not possess perfect information about individual politicians, which allows some of them to get away with substantial self-enrichment. This need not undermine the separating effect of electoral control so long as it remains the exception rather than the rule and politicians continue to believe that an electoral constraint is in principle present.

### 3.3 Discussion

The analysis suggests that electoral control can constrain politicians' behavior despite occasional "failures". The fact that some politicians get away with untrustworthy behavior does not mean that others are not optimizing subject to the electoral constraint they believe to be in effect.

The mechanism behind electoral control of politicians' behavior is not the reduction of the number of untrustworthy (corrupt) individuals in politics, but rather the preclusion of trustworthy and untrustworthy politicians alike consuming the highest institutionally attainable self-enrichment. This means that while politicians' motivations matter to their conduct while in office, as Fedele and Naticchioni [5] demonstrate, electoral control is what *makes* them matter. Note that the study [5] was in fact conducted in Italy, a country with regular democratic elections and fair availability of information about politicians' behavior, judging by the fact that data on politicians' absenteeism and pre-election income were available to the researchers.

Cross-country studies [1] [9] [12] establish a negative relationship between the presence of democratic elections and corruption, a particular kind of untrustworthy behavior, because they compare institutional environments where politicians pool with environments where they separate according to their individual preferences, which makes a tremendous difference in the aggregate level of corruption. Single-country studies [7] [11] [13], by comparison, operate within one of the two scenarios, either pooling or separating. In the pooling case, there is no trade-off between corruption and electoral outcomes. Such trade-off is in principle present in the separating scenario, but may be diluted by voters' imperfect information about individual politicians as well as by the influence of candidates' personal characteristics.

These insights follow from a microeconomic approach in which politicians maximize utility subject to electoral control and a trust budget. The model presented allows for the two widespread notions of why voters support corrupt politicians. The *information hypothesis* would be associated with a horizontal electoral constraint; and the *trade-off hypothesis* could be illustrated by contemplating the case of two politicians with different trust budgets, i. e. with electoral constraints at different distances from the origin. An extended version of the model might attempt to capture the strategic considerations of trustworthy and untrustworthy politicians along the lines of Callander's [3] analysis of the behavior of policy-motivated and office-motivated candidates in elections.

## 4 Conclusion

Two concerns motivated this paper: the discrepancy between cross-country and national studies as far as the corruption-curbing effect of elections is concerned, and the associated puzzle as to how democratic elections constrain politicians' untrustworthy behavior when voters fail to punish corrupt politicians.

Formulating the politician's optimization problem as utility-maximization from the consumption of two goods, self-enrichment and election votes, subject to an institutional and an electoral constraint reveals that electoral control is first and foremost about preventing the pooling of politicians at the highest institutionally attainable level of self-enrichment. The fact that *some* politicians get away with corruption does not amount to failed electoral control; yet such cases are detrimental to the extent to which they cause other politicians to believe that no electoral constraint is in place.

The findings of cross-country and national studies are thus not contradictory. The effect of democratic elections observed in international data is driven by differences in aggregate levels of corruption under the pooling and separating scenarios. Single-country studies operate within one of the two scenarios, which makes such stark differences unobservable.

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**SESSION II:  
PUBLIC FINANCE**

# Taxation of Labor Income in Japan and Republic of Korea: a Comparative Study

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## Abstract

We analyze the main features of current personal income tax system in Japan and Korea. Both countries have progressive personal income tax schedules. Individual income tax rate in Japan exceeds average for Asian countries almost by 26%, while Korean personal income tax rate exceeds average by 10%. The calculated indices for the overall tax wedge and its components in Korea and Japan allowed us to determine that in Japan the progressivity of personal income tax rate and overall tax wedge are lower than OECD average, while in Korea these values are higher than OECD average, due to targeted provisions for low incomes in Korea. The regression analysis showed that in Japan only labor force participation rate influences on the labor productivity, while in Korea the latter is influenced additionally by labor freedom index, determining quality of labor market institutions. It can be explained by different trends, related to the digital transformation, specifics of the long-term employment and wage schedules, and by different levels of labor market inequality.

*Keywords: personal income tax; tax wedge; labor productivity; labor freedom index; progressivity*

JEL Classification: E24, J22, J30, P51

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## 1 Introduction

Currently, the economic growth is difficult to attain without evolution of the labor market. The latter is a particular type of relationship and bargaining between independent employers and employees, which complies with rules of demand and supply, but simultaneously differs from other commodity markets by principles of its activity.

Notably, main features of the labor market can be summarized as follows. First, the commodity price (i.e. wage) cannot be less than market value of minimum set of goods and services, necessary for life-sustaining activity of individuals. Second, the levels of labor supply and demand are influenced not only by economic forces, but also by demographic, social, psychological and other similar factors, which are directly attributable to households' activity. Third, is the strong role of the state, adjusting the labor market development. Herewith taxes are an important regulatory instrument in the vast majority of countries. The impact of income taxes on labor supply depends both on the income tax schedule (progressive, regressive or flat) and on individual preferences related to work and leisure.

In most of developed countries the personal income tax schedules are progressive since they were established under the mainstream economic trend that the progressive tax system allows to come close to the achieving the equity principle, which in turn is an important instrument to alleviate poverty. However, at the same time the substitution effect between work and leisure should be considered. According to tax theory, the progressive tax system reduces work incentives, and, consequently, influences on the labor income.

The situation in the labor market in definite periods allows employers to reduce their production costs, particularly by reducing expenses associated with employment conditions. The latter can also have disincentive effects.

Therefore, the purpose of the paper is to analyze current systems of labor income taxation in Japan and Republic of Korea.

The article is structured as follows. In Section 2 we briefly examine current personal income tax systems in Japan and Korea, compare them with existing ones in Asia-Pacific region

and determine the methodology. Sector 3 presents the results of empirical estimation of progressivity of tax wedge, several labor market performance indicators and further discussion. Section 4 concludes.

## 2 Material and Methods

In contrast to the majority of Asian countries, where more than 75% of tax revenue proceeds from two broad categories of taxes: taxes on income and profits and taxes on goods and services, the tax revenue in Japan and Korea splits between three categories of taxes, including additionally social security contributions. These tax structures are similar to other OECD countries [15].

### *Personal income tax system: Japan*

For the tax treatment, there are two broad categories of individuals: residents and non-residents. The former is divided additionally on permanent and non-permanent residents depending on citizenship and duration of stay in the country). All individuals, who are not qualifying as residents are non-residents.

There are *two broad categories of individual income* for taxation purposes: foreign-sourced income, and income other than foreign-sourced income

In turn, they are divided into following types: paid within Japan and paid outside Japan. The latter for the foreign-sourced income can be remitted to Japan or not (other types of foreign-sourced income).

Now in Japan the income (domestic-sourced and foreign-sourced) of both permanent residents and non-permanent residents is liable to personal income tax, except other types of foreign-sourced income, received by non-permanent residents. As for non-residents, their foreign-sourced income of all types is exempted from personal income tax.

Moreover, as from 1 January 2017, for the non-permanent residents the salary paid based on the work in Japan is considered as domestic-sourced income even if it is paid outside Japan [14]. Until 31 December 2016, non-permanent residents were taxed only on domestic-sourced income, provided foreign-source income was not paid in or remitted to the country. Under new rules, an income arising from the sale of shares and/or securities after 1 April 2017 that were acquired by non-permanent residents on or before 1 April 2017 can be excluded from the taxable base [20].

The tax base for the self-assessed income tax is the individual's income for the calendar year.

Table 1. presents current national individual's income tax rates.

**Table 1. The current personal income tax rates in Japan (Source: author, based on [11]).**

<b>Taxable income (JPY) Within limits</b>	<b>Amount of tax (JPY)</b>	<b>Tax on excess (%)</b>
0 - 1,950,000		5
1,950,000 - 3,300,000	97,500	10
3,300,000 - 6,950,000	232,500	20
6,950,000 - 9,000,000	962,500	23
9,000,000 - 18,000,000	1,434,000	33
18,000,000 - 40,000,000	4,404,000	40
40,000,000 and more	13,204,000	45

Note: the rates are uniform and do not depend on marital status etc.

To increase tax revenue in order to finance post-earthquake reconstruction, 2.1% temporary surtax on national income tax is in effect in Japan for 25 years – from 2013 to 2037 [10].

Combined, these taxes “generate” the highest effective personal income tax rate as 55,945%. An additional charge JPY 1,000 is levied on individuals, when they settle their local tax for the year [20].

Besides national individual’s income tax, the local inhabitant’s tax is levied in Japan. It is the collective term for prefectural tax and municipal tax on individual income. This tax levies at a flat rate of 10% on a taxpayer’s prior year income. In general, the individual inhabitant taxes include an income-graded component and a fixed amount component. The former is assessed on income for the previous year.

The standard rates of local inhabitant’s tax for the income-graded component are 4% and 6% for prefectural and municipal levels respectively. The employment income of non-residents is subject to a flat 20.42% national income tax. This rate includes 2.1% of the earthquake surtax [10; 11].

#### *Personal income tax system: Korea*

The current Korean tax law extended the existing time limit for the application of the flat tax rate as of 31 December 2018. The flat tax rate will be adjusted from 17% to 19% (excluding local income tax) and this change in tax rate will be applied to the income generated from 1 January 2017.

For the tax purposes, all individuals are divided into two categories: residents and non-residents. An individual can be considered as resident if he has a domicile in Korea or has a residence within Korea for 183 days or more, including occupation, accompanying families, retaining substantial assets etc. In general, the residency is evaluated on an individual basis. All individuals, who are not qualifying as residents are non-residents [12].

Korean residents are subject to tax on worldwide income. The residents who have stayed in the country no more than five years during the last 10 years are taxed only on their foreign-sourced income paid or transferred to Korea. A non-residents are taxed only on certain Korean-sourced income [20].

For the tax treatment the individual’s income is divided into Class A or Class B employment income, depending on the income source:

- class A includes employment income received from a Korean corporation or a Korean office of a foreign corporation for services rendered in Korea, and
- class B includes income received from a foreign corporation outside Korea [12].

The individual’s income tax is assessed for one year from 1 January to 31 December.

Korea has the progressive personal income tax schedule with rates, ranging from 6% to 40% with national personal income tax (paid to the National Tax Service), and local income tax (paid to the city or the province that is the domicile of the taxpayer), assessed at a rate of 10% of the national personal income tax rates (Table 2).

**Table 2. The current personal income tax rates in Japan (Source: author, based on [12]; [21]).**

<b>Annual taxable income (KRW) within limits</b>	<b>Total tax on income below bracket*, KRW</b>	<b>National tax rate on income in bracket, %</b>	<b>Local tax rate on income in bracket, %</b>
0 – 12,000,000	0	6	0,6
12,000,000 – 46,000,000	720	15	1,5
46,000,000 – 88,000,000	5,820	24	2,4
88,000,000 – 150,000,000	15,900	35	3,5
150,000,000 – 500,000,000	37,600	38	3,8
500,000,000** and more	170,600	40	4,0

Note:

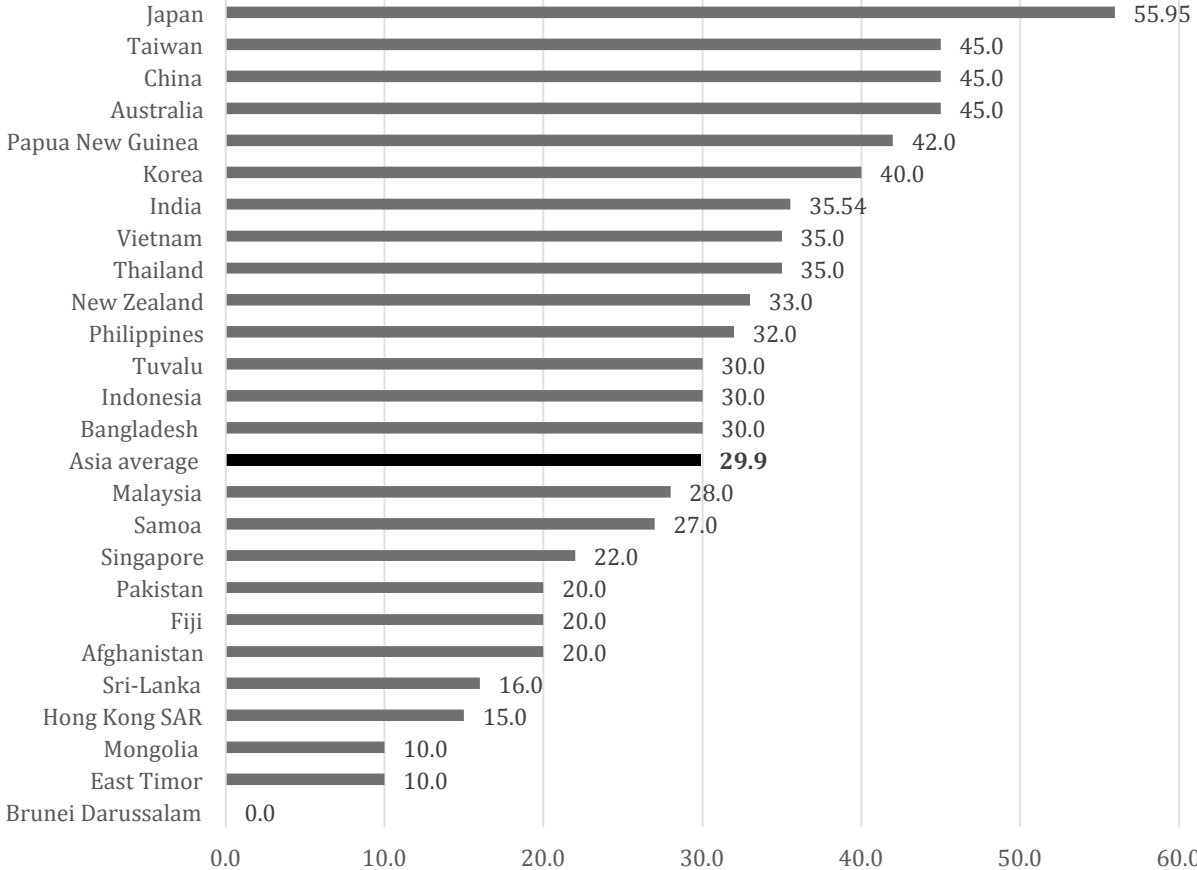
\*Before applying the local income tax.

\*\*Effective from 1 January 2017

However, expatriates can elect to apply a 19% (effective from 1 January 2017) flat tax rate to total Korean-sourced employment income.

The progressivity of the individual income tax depends crucially on the number and width of the tax brackets, and on the difference between the top and the bottom rate. Japan and Korea, as all countries of East Asia and Pacific region, except Mongolia and Timor-Leste, have progressive income tax schedule. Moreover, Japan has the highest personal income tax rate among Asian countries (Fig. 1).

**Figure 1. Personal income tax rates in East Asia and Pacific, and South Asia countries, 2017 (Source: author, based on [9]).**



As one can see on the Fig. 1., individual income tax rate in Japan exceeds average for Asian countries almost by 26%, while Korean personal income tax rate exceeds average by 10%.

However, taking into account the importance of social security contributions in Japan and Korea the overall tax wedge should be considered as well as its progressivity. OECD defines tax wedge as the ratio between the amount of taxes paid by an average single worker (a single person at 100% of average earnings) without children and the corresponding total labor cost for the employer. This indicator is measured in percentage of labor cost.

We used data provided by OECD Taxing Wages [15], International Labor Organization [8], the Heritage Foundation [13] and KPMG [9] to estimate quantitatively (including regression analysis) the progressivity of tax wedge and its components, and several indicators of labor market performance in Japan and Korea.

### 3 Results and Discussion

We estimate the degree of progressivity of overall tax wedge and its components in Japan and Korea for 2011-2016 (Table 3).

**Table 3. Progressivity index for Japan and Korea, 2011-2016 (Source: author's calculations, based on [15]).**

Indicator	Year	Japan	Korea
<b>Employer's social security contributions</b>	2011	0,74	0,83
	2012	0,81	0,83
	2013	0,76	0,79
	2014	0,76	0,79
	2015	0,75	0,79
	2016	0,74	0,79
<b>Employee's social security contributions</b>	2011	0,80	0,77
	2012	0,80	0,77
	2013	0,75	0,72
	2014	0,75	0,73
	2015	0,74	0,73
	2016	0,72	0,73
<b>Personal income tax</b>	2011	1,24	1,40
	2012	1,24	1,40
	2013	1,25	1,48
	2014	1,25	1,48
	2015	1,25	1,49
	2016	1,25	1,49
<b>Overall tax wedge</b>	2011	1,11	1,19
	2012	1,10	1,20
	2013	1,11	1,24
	2014	1,10	1,24
	2015	1,10	1,25
	2016	1,10	1,25

Notes:

1) to calculate the progressivity index we used the following formula

$$Progressivity\ index = \frac{1}{N} \sum_{i=1}^N \left( \frac{METR_i}{AETR_i} \right) \quad (1) ,$$

where METR is the marginal tax rate; AETR is the average tax rate, i.e. the share of tax burden in the taxpayer's gross labor income; N are levels of labor income (50%-250% of the average workers income); N = 201, i = 1 ... N [19].

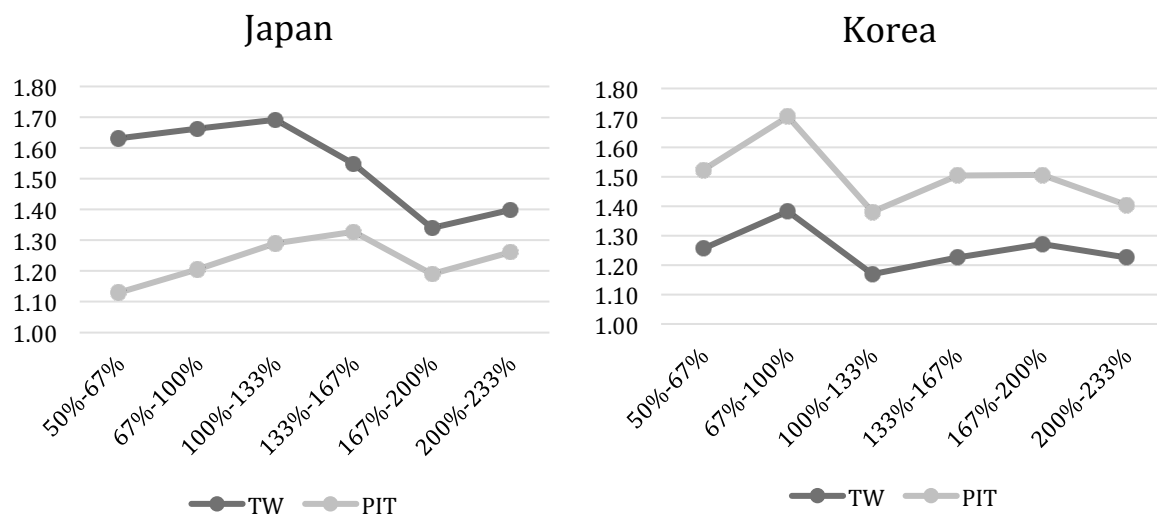
2) all indicators are for a single person at 100% of average earnings, with no child;

In both Japan and Korea for single taxpayers without children, the tax wedge progression is lower than the PIT rate progression. This means, that social security contributions tend to reduce tax progressivity, primarily because they are levied at a flat rate.

In Japan the progressivity of personal income tax rate and overall tax wedge are lower than OECD average, since government does not provide special provisions reducing employee's and employer's social security contributions for low-income workers. In contrast, Korea provides targeted provisions for low incomes, and this is the main reason why the progressivity of individual income tax rate and tax wedge are higher than OECD average.

We calculated progression rates for the six income intervals. According to the OECD methodology, the income levels are expressed as multiples of the average wage. Figure 2. shows personal income tax rate and overall tax wedge progression in Japan and Korea for the six income intervals.

**Figure 2. Personal income tax rate and overall tax wedge progression in Japan and Korea, 2016 (Source: author, based on [14]).**



Note: TW is the overall tax wedge, PIT is the average personal income tax rate

For single taxpayers without children in Japan Fig. 2 demonstrates that the PIT rate progression reaches its highest level (1,33) at the interval 167%-200%, while progression of the overall tax wedge is maximal at the third income interval 100%-133%. It can be observed that progressivity levels of overall tax wedge and personal income tax are differently directed, except for highest income intervals. It is explained again by absence of special provisions reducing employee and employer social security contributions for low incomes in Japan.

In Korea, in contrast, the progressivity levels of both personal income tax and overall tax wedge are unidirectional.

The high level of individual income tax schedule leads to the decrease in labor productivity and pretax wage [1].

The reduction in personal income tax rates leads to the increase of an aggregate consumers' demand as a result of increased households' disposable income. On the supply-side, such cuts can cause the higher labor productivity [4; 6; 18].

Some studies with general equilibrium and simulation models argued that the impact of tax policy on labor productivity depends on labor-market institutions, such as minimum wage laws, wage bargaining, and unemployment benefits [2; 5].

The quality of labor market institutions can be characterized by labor freedom index (estimated by the Heritage Foundation), which is the quantitative measure considering different aspects of the legal and regulatory framework of a country's labor market, notably

- ratio of minimum wage to the average value added per worker
- hindrance to hiring additional workers
- rigidity of hours
- difficulty of firing redundant employees
- legally mandated notice period, and
- mandatory severance pay [13].

The institutional similarities of Japanese and Korean labor markets caused by comparable government policy in that area are well-known. These measures focus on strong employment protection for the full-time permanent workers, decentralized wage bargaining, seniority-based wage schedule, awarding compensation according to individual's job tenure not to his/her performance etc. [7; 17].

Nevertheless, at the same time the regression analysis showed that the productivity of labor in Korea is influenced by both labor freedom index and labor force participation rate, while in Japan labor force participation rate influences on the labor productivity.

It can be explained by the following.

First, the digital transformation, technological innovations, notably in artificial intelligence, Internet of Things, and big data, encourage substitution between workers and robots. The machines do not require social protection, minimum wages and severance pay. During 2004-2016 Japan occupied leading positions in digital development in the region. Now the country, according to the Asian Digital Transformation Index [3], maintains this position on industry connectivity index, which estimates the ability to draw on resources external to the organization.

The second thing to be considered is the specifics of the long-term employment in Korea, compared to Japan. In Korea, the long-term employment practice extends only to large companies, while in Japan it covers all companies regardless of their size. Therefore, more workers in Korea are concerned about social protection.

Third is the pattern of wage schedule. In both Japan and Korea, most permanent workers are paid according to the seniority-based wage schedule. Nevertheless, in Japan in general the wages grow rather slowly and permanently until preretirement age, while in Korea salaries increase very fast until age of 40-45, and after they stay at the same level. This is another reason for workers' concerns about social protection measures.

The last and the most integral aspect is related to different levels of labor market inequality in Japan and Korea. Different trends in labor market reforms resulted in a higher level of disparities in Korean labor market.

#### **4 Conclusion**

We briefly discuss the main features of current personal income tax system in Japan and Korea. Both countries have progressive personal income tax schedules. Individual income tax rate in Japan exceeds average for Asian countries almost by 26%, while Korean personal income tax rate exceeds average by 10%.

We calculated progressivity indices for the overall tax wedge and its components in Korea and Japan. It allowed us to determine that in Japan the progressivity of personal income tax rate and overall tax wedge are lower than OECD average, while in Korea these values are higher than OECD average, due to targeted provisions for low incomes in Korea. The absence of such provisions in Japan causes the different directions of progressivity levels of overall tax wedge and personal income tax, except for highest income intervals, in Japan.

The regression analysis showed that in Japan only labor force participation rate influences on the labor productivity, while in Korea the latter is influenced additionally by labor freedom index, determining quality of labor market institutions. It can be explained by different trends, related to the digital transformation, specifics of the long-term employment and wage schedules, and by different levels of labor market inequality.

The future research will focus on analysis of the components of labor freedom index and estimation of their impact separately on labor productivity in conjunction with personal income taxation on Asian countries.

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# Hidden Expenditures: Fiscal Effect of Tax Expenditures

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## Abstract

The purpose of the paper is to examine the association between tax expenditures, treated as hidden indirect public spending, and direct expenditures as well as the balance of the state budget. Using this type of fiscal constructs results in decreased tax revenues and increased financial activity of the state, unreported in the budget. The conducted research has allowed the author to confirm the following hypothesis: failure to reveal tax expenditures in budget reporting leads to the false belief that public spending is actually lower than it is in reality, as a result of which the existence of a budget surplus is sometimes only illusory. The analysis comprises selected EU countries. The study was conducted on the basis of literature analysis and empirical data obtained from the Eurostat. The paper also uses reports on tax expenditures published by the treasury ministries of the selected countries. The study was made by means of the descriptive method with elements of statistical analysis. The analysis concerns the years 2010-2016. On the basis of the conducted research, it was concluded that the economic effect of tax expenditures is equivalent to direct public expenditure programmes, which is why they should be revealed and taken into consideration when reporting state budget balance. In the investigated countries, tax expenditures accounted for 11% to over 43% of the value of direct public expenditures and had a considerable impact on the state of public finances.

*Keywords: tax expenditures; fiscal consolidation; state budget expenditure; budget reporting*

JEL Classification: H61, H62, H71, H72

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## 1 Introduction

Up until the year 2013, fiscal consolidation in the EU countries involved, above all, enhancing the revenues, mainly from increased taxes. In the years 2010-2013, the share of public revenues in the GDPs of the EU states grew on average by nearly 2 percentage points (from 43.5% in 2010 to 45.4% in 2013). Meanwhile, the ratio of public expenditures to the GDP dropped by less than 1 pp (from 49.9% to 48.7%, respectively). From 2014, it was assumed that by 2017 public expenditures in the EU countries would have been reduced by an average of 1.5 pp: from 48.8% to 46.5% of the GDP (while revenues from 45.2% to 44.9% GDP, respectively) [1]. That limit, however, did not take account of the so-called tax expenditures, usually skilfully concealed outside budget acts, thus leaving a loophole that allowed governments to discretely raise public expenditure and misrepresent the state of public finances, particularly the size of the government, measured by the share of public spending in GDP.

Tax expenditures (TEs) involve preferential treatment of some taxpayers or selected groups of taxpayers, meant to facilitate the achievement of certain socio-economic goals, e.g. diminishment of inequalities, promotion of particular forms of employment, support for certain activities, investments, innovations, etc. TEs come in a variety of forms, such as exemptions, deductions, tax reliefs, or deferments of tax [9]. They lower the tax burden on citizens but might, in some cases, deform economic stimuli, both as regards consumption and investment. As a 'convenient' instrument of fiscal policy, being a substitute of direct public spending, they are widely applied by state governments, not only in the EU, even though their impact on the budget is not always known.

The term 'tax expenditures' was first introduced in the 1960s by Stanley S. Surrey [12], a professor of law at the University of Harvard, the *Deputy Secretary of the Treasury* in the US government, responsible for tax reforms. In 1967, Surrey ordered his co-workers to compile a list of those income tax preferences which would have a similar character to direct public spending programmes. Surrey's primary motivation was to streamline the budget process and

accelerate the reform of the income tax. Thanks to the elimination of constructs which could be replaced by expenditures financed directly from the budget, the tax base in personal income tax would be widened, thus increasing the revenue derived from that source.

The choice of the term 'tax expenditures' was deliberate. By using the phrase instead of tax reliefs, Surrey intended, first of all, to shock the lawmakers and compel them to acknowledge that the constructs belonging to that category should be subjected to the same kind of merit-based assessment as direct public spending. It was Surrey's intention to emphasise the similarity of some reliefs which diminished the tax burden to direct public expenditures aimed at accomplishing specific socio-economic (or political) objectives. However, he explicitly observed that not all tax exemptions should be classified as belonging to the uniform group of TEs, as some of them formed the foundations of the tax system, were too general in nature, and should not be treated as indirect public expenditures. The use of this type of fiscal constructs leads to reductions in tax revenues and increases the financial activity of the state that remains unreported in budget documents, which seriously distorts the state of public finances.

The present paper aims to investigate the relationship between tax expenditures, treated as hidden indirect public spending, and direct expenditures, as well as state budget balance. The main purpose of the paper has been realised in two ways. First, the author demonstrates the range in which TEs are applied as indirect public expenditures which replace direct public programmes in some countries. Second, by means of statistical methods, their influence on the public finance sector is assessed.

## **2 Material and Methods**

Before proceeding to analyse tax expenditures, it is essential that a precise definition of the term is provided since it can have a strong impact on the identification of TEs in national tax systems. Depending on what preferences are regarded as TEs, their estimated value may ultimately vary. Surrey and McDaniel [13] initially defined TEs as specific tax exemptions or reliefs which realised socio-economic goals dedicated to selected groups of taxpayers, which did not form the foundation of the structure of a given tax. This definition of tax expenditures is the most frequently quoted in the literature. However, the differences between the tax systems across countries and the classification of their particular elements as TEs have long been subject to debate. This is a considerable obstacle to international comparisons. For this reason, in practice, TEs are usually defined on the basis of the so-called collection of positive features, as do the two definitions presented below, according to which tax expenditures are:

1. Constructions present in tax codes which realise the objectives of social or economic policies, reduce or defer tax obligations, support specific activities or groups of taxpayers, which can be substituted with direct public expenditure programmes [7].
2. Constructions which realize non-fiscal goals, lower tax burdens for limited or selected groups of taxpayers, can be replaced with direct public expenditure programmes, are not of administrative nature, and do not result from double taxation on a domestic level [4].

The above definitions have much in common: they both refer to revenue forfeited by the state budget and the possibility of replacing TEs by direct expenditures. Nevertheless, they also contain subtle differences, e.g. in terms of including TEs in the category of deferred tax, which can have a significant bearing on the identification and value of TEs (deferred tax is classified as a TE, e.g., in the USA and Canada). The lack of consensus as to the definition of TEs should make one cautious when drawing conclusions from research results, particularly in the case of international comparisons.

The comparative analysis included in the paper comprises Poland and Scandinavian countries. This choice can be justified by the stable condition of the public finances in these economies in the past few years, as well as by the fact that they define TEs very similarly. In all analysed countries, it is assumed that they are deviations from the baseline tax structures (although the benchmark varies from one country to another), designed to directly aid

taxpayers, at the same time lowering the state budget revenue. Analysing the individual ways of TEs defining, some individual approaches to certain issues can be found. For example in Norway TEs are exceptions to generally accepted rules, which result in lowering the budget tax revenues by a more preferential treatment of a specific group of taxpayers or activities [11]. In the Norwegian definition, the most important element is the idea of "generally accepted principles" or so called "reference tax system" – an element that can be defined as a tax standard. However, in this approach, the definition of a tax standard was dropped – as a certain theoretical construction. A practical approach has been applied, by adopting general principles in the current tax system. The reference tax system is described as a system based on the general rules in the tax system where equal persons, activities and goods are taxed according to the same principles and at the same rates. Exemptions from the reference tax system are regarded as TEs [8]. Those rules are the principle of equality, neutrality or symmetry of taxation.

In defining the TEs (*verotuet*) in Finland, a standard approach is used. It is assumed that under these categories there are constructions causing a departure from the benchmark tax system, which is considered as a system based on the principle of the general taxation. In that principle, the subject of taxation is the sum of all income, where the tax base is as wide as possible. They are therefore instruments that implement indirect support, integrated into the tax system [11].

In the case of Sweden, it should be stated that the basic principle of constructing the tax system was the principle of uniform taxation (*principen om enhetlig beskattning*) [12]. The definition of TEs applies to this principle. The reference tax system in the TEs analysis is a system that was based on the principle of uniformity of taxation, and any departure from this principle constitutes TEs or tax sanctions [8]. TEs are also defined in the context of budget expenditures – they are therefore estimated unrealized tax revenues, i.e. sums that are often less visible in budget documents than the sum of budget expenditures [6].

The Polish practice of defining TEs does not differ from the ones presented above. In the first report from 2010, the authors adopted a definition modelled on OECD's documents, but more emphasizing the selectivity of this type of construction. They assumed that TEs can be defined as "...a transfer of public resources that is achieved by reducing tax liability with respect to a benchmark tax..." [6].

Despite the similarity of presented definitions, it should be clearly emphasized that the comparative analysis is burdened with certain errors, the most important of which are: the differentiation of qualifying individual tax preferences to benchmark tax system or to TEs, as well as the different methods of TEs estimating. Care should therefore be taken when drawing specific conclusions from comparative analysis.

In all the analysed Scandinavian jurisdictions, reports on TEs are a vital part of budget documentation, and the main purpose of their publishing is to increase the transparency of fiscal policies.

On the basis of conducted research, an attempt is made to verify the following hypothesis: failure to reveal tax expenditures in budget reporting leads to a false impression that public expenditures are lower than they actually are, as a result of which the existence of a budget surplus is, in some cases, purely illusory. In order to confirm the hypothesis, an analysis of the descriptive statistical data is made and conclusions were drawn using Pearson's correlation tests. The analysis deploys data from the Eurostat, reports on TEs published by the treasury ministries of the analysed countries, and indicators associated with the state of public finances in the EU countries available via the Eurostat database.

### **3 Results and Discussion**

TEs are an instrument, alternative to traditional public expenditures, which can be used to implement various socio-economic objectives pursued by government policies. Similarly to direct government spending, they are streams of monetary resources expended by the authorities on the needs of society, being, in a sense, their substitute. It can be said, therefore,

that direct public programmes and TEs are two basic ways in which a government can support society. The latter, however, are evidently selective in nature and are directed to specific groups of people, however, instead of being drawn directly from the budget, they are implemented as reductions in the fiscal burdens of certain groups of taxpayers. This 'reduction' is very measurable: its value can be calculated, e.g. on the basis of the amount of a tax that would be due if a given taxpayer were not entitled to use a preferential instrument, or if such preferences did not exist in the tax code. And although using TEs in a tax system ultimately leads to reductions in state budget revenue, the governments of many countries frequently resort to this form of interference in the economy.

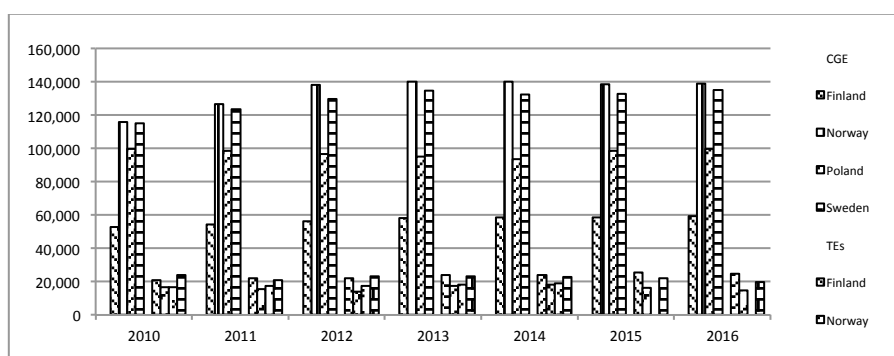
The extent in which TEs are used, can be measured, e.g. by the share of their estimated value in the GDP. In the years 2010-2016, in the studied countries, this share varied: from 3.54% in Norway (2012) to 12.12% in Finland (2015). During the analysed period, the smallest changes were observed in Poland, where the relation of TEs to the GDP changed only by 0.01 pp within four years (data from 2015 and 2016 are not available as in Poland reports concerning TEs are published with a long time delay; the latest regards 2014), whereas the greatest changes took place in Sweden, where this share decreased by 2.20 pp. In Finland, where TEs are used to the broadest extent, the ratio grew by 0.30 pp. Because of methodological differences in terms of identification and estimation of TEs, interpretation of the data for the purpose of international comparisons is open to debate. Yet, even the available information justifies the conclusion that these instruments, classified as back-door expenditures [3], are consistently used in several countries (Table 1).

**Table 1. Relation of TEs to GDP in selected countries (Source: author's own calculations based on Eurostat data and national TEs reports)**

Country	2010	2011	2012	2013	2014	2015	2016	Average	Change in pp
Finland	11.21%	11.23%	11.08%	11.73%	11.76%	12.12%	11.52%	11.52%	0.30%
Norway	5.16%	4.29%	3.54%	4.39%	4.87%	4.65%	4.38%	4.47%	-0.78%
Poland	4.65%	4.60%	4.53%	4.64%	4.64%	No data	No data	4.61%	-0.01%
Sweden	6.47%	5.18%	5.48%	5.36%	5.27%	4.92%	4.28%	5.28%	-2.20%

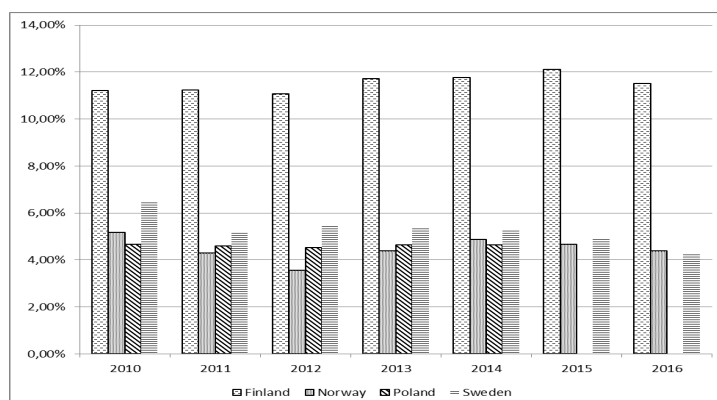
TEs which are included in tax legislation and are understood as indirect public expenditures are less transparent than those published in the budget documents [16]. TEs are not subject to such detailed scrutiny as direct expenditures, regardless of whether they result from newly introduced tax preferences or ones that have long been present in the tax system. The fact that TEs do not have to be identified, estimated, or be part of transparent procedures, undoubtedly encourages politicians to replace direct expenditures with indirect ones, i.e. TEs. They are a convenient instrument, particularly in view of the fact that parliaments are not required to approve the level of TEs. The experiences of the studied countries vary in this regard. From the data presented in Figure 1 (for comparative purposes, the data is expressed in euros), it can be inferred that the value of the public tasks funded from central budgets varies significantly across the countries: from an average of approx. €57 billion in Finland to about €134 billion in Norway. However, if we compare the values of estimated TEs, this difference is not so considerable. On a yearly average, TEs were used most intensely in Finland (€23,350 million), while the least in Norway (€16,104 million).

**Figure 1. Central government expenditures and tax expenditures in selected countries (in million euros)**  
 (Source: author's own calculations based on Eurostat data and national TEs reports)



Therefore, a juxtaposition of the values of central government expenditures with the values of TEs reveals that the greatest scope of interference in the tax system on the part of the state is found in Finland, where the share of TEs in overall spending grew in the studied period by over 2.3 pp, to exceed 43% in 2015. Polish politicians also eagerly used TEs: their share in 2014 stood at over 20%, having increased by more than 3.5% since 2010. In Poland, that increase was accompanied by a rise in direct expenditures. In Sweden and Norway, in 2015, the relation of TEs to overall public spending amounted to 16.63% and 11.71%, respectively. The share had been falling systematically since 2010 (of the studied countries, most rapidly in Sweden). Additionally, the years 2014-2015 brought a decline in direct public spending in those countries. In Sweden, meanwhile, the effect of substitution (increased direct public spending and decreased TEs) can be observed. The above analysis indicates that a large part of public expenditures of the countries in question is not included in the budget documentation. This often creates the illusion that public spending does not grow or that it grows only minimally, while the public finance sector is stable. But is that indeed the case?

**Figure 2. Relation of TEs to central government expenditures in selected countries (in %) (Source: author's own calculations based on Eurostat data and national TEs reports)**



Among the most important problems in analysing TEs is the question of comparability and mutual substitutability of direct budget expenditures and TEs. For certain instruments to be appropriately applied to obtain desired results, an efficiency analysis has to be conducted beforehand so that the decision-makers could choose the most useful tool. The problem of substitutability and equivalency of these two groups of instruments stems from their specific character and their legal bases in particular jurisdictions [17]. If no budgetary restrictions exist for indirect expenditures, it is only natural that politicians will be more inclined to use TEs rather than direct budget expenditures. Such a situation can directly lead to a fiscal illusion, where low budget expenditures can be accompanied by a relatively low deficit. It will be, nevertheless, illusory, since public aid can be provided outside budget reporting through the use of back-door instruments (e.g. TEs).

The countries which are investigated in this study differ in terms of the relationships between TEs and government spending. Analysis of data (Table 2) reveals that it was in Finland that these two types of instruments were found to be the most complementary. In the years 2010-2016, TEs accounted there, on average, for 41% of direct expenditures and were positively correlated with them. This is confirmed by Pearson's coefficient equal to 0.97. A positive correlation between the two instruments can also be observed in Norway (Pearson's coefficient equal to 0.55). In that country, however, TEs are used to a much lower extent: 12.07% of government spending, on average. Meanwhile, the opposite relationship occurred in Poland and Sweden, where the higher direct budget expenditures grew, the lower the involvement of the government in indirect TEs became (Pearson's coefficients: -0.47 and -0.41, respectively). In both these countries, the proportion of aid in the form of TEs as compared to government expenditures was similar, amounting to 18.52% and 17.37%, respectively.

**Table 2. Total government expenditures, tax expenditures and central government: Net lending (+)/Net borrowing (-) in selected countries (in million euro) (Source: Author's own calculations based on Eurostat data and national TEs reports)**

	2010	2011	2012	2013	2014	2015	2016	
Finland	52 992	54 188	56 247	58 059	58 764	58 481	59 245	TGE
	20 977	22 106	22 136	23 846	24 154	25 401	24 830	TEs
	-9 951	-6 402	-7 401	-7 579	-7 761	-6 338	-5 793	CGLB
Norway	115 996	126 512	137 970	139 978	140 200	138 708	138 828	TGE
	16 717	15 383	14 076	17 286	18 356	16 212	14 702	TEs
	38 427	50 681	57 213	45 411	35 724	22 205	14 707	CGLB
Poland	99 605	98 468	96 498	94 920	93 709	98 667	99 603	TGE
	16 833	17 483	17 634	18 331	19 066	No data	No data	TEs
	-21 275	-15 151	-14 109	-14 412	-9 509	-9 520	-11 177	CGLB
Sweden	114 984	123 550	129 868	134 785	132 408	132 906	134 905	TGE
	23 897	20 993	23 190	23 353	22 795	22 099	19 906	TEs
	-1 424	-1 565	-4 439	-4 938	-5 358	1 320	7 325	CGLB

TGE – Total government expenditure

CGLB – Central government: Net lending (+)/Net borrowing (-)

TEs – Tax expenditures

In all the analysed countries (except for Norway), if the values of TEs had been taken into account, the budget deficit would have increased or, in the case of Sweden in the years 2015-2016, would have occurred. Only Norway has a sufficiently large budget surplus to avoid a deficit even if TEs are accounted for. In the studied period, the countries in question all had budget deficits, apart from Norway (throughout the analysed period) and Sweden (in 2015-2016). In Poland and Finland, the levels were similar, in relation to the GDP, and stood on average at 3.64% and 3.47%, respectively. In the analysed period, Sweden's budget was, on average, balanced, whereas Norway had an average surplus of 10.31%.

To sum up, had the identified and estimated values of TEs been taken into consideration in the budget reports, the official statistics published by the four studied countries would have changed (Table 3). The situation would have been the worst in Finland, where the relation of the newly calculated budget to the GDP would have grown to over 15% (a rise by 11.5 pp), while the smallest change would have taken place in Poland: 3.29 pp. In Sweden and Norway, these changes would have amounted to 5.28 pp and 4.47 pp. In a sense, these figures may be regarded as a measure of the existing fiscal illusions, i.e. underestimation of the occurring deficits or overestimation of budget surpluses.

**Table 3. State budget surplus/deficit in relation to GDP in selected countries (Source: Eurostat data and national TEs reports)**

Country	2010	2011	2012	2013	2014	2015	2016	Average
Finland	-5.32%	-3.25%	-3.70%	-3.73%	-3.78%	-3.02%	-2.69%	-3.64%
Norway	+11.86%	+14.13%	+14.41%	+11.53%	+9.48%	+6.37%	+4.38%	+10.31%
Poland	-5.88%	-3.98%	-3.62%	-3.65%	-2.31%	-2.21%	-2.62%	-3.47%
Sweden	-0.39%	-0.39%	-1.05%	-1.13%	-1.24%	+0.29%	+1.57%	-0.33%
<b>Including TEs</b>								
Finland	-16.53%	-14.48%	-14.78%	-15.45%	-15.53%	-15.14%	-14.20%	-15.16%
Norway	+6.70%	+9.84%	+10.86%	+7.14%	+4.61%	+1.72%	0.00%	+5.84%
Poland	-10.53%	-8.58%	-8.15%	-8.29%	-6.95%	-2.21%	-2.62%	-6.76%
Sweden	-6.86%	-5.57%	-6.53%	-6.49%	-6.51%	-4.63%	-2.70%	-5.61%

The presented changes in the balance of budgets after accounting for TEs have yet are obligatory in the public sector. The application of TEs instead of direct expenditures, which must be included in budget acts, is an efficient way to evade these rules. Furthermore, international restrictions (e.g. those imposed by the European Union) should be taken into consideration. One of the most frequently mentioned measures is the annual deficit to GDP ratio.

While analysing the fiscal effects of using TEs, one should clearly emphasise, however, that their elimination from the tax system leads, above all, to an increase in tax revenues, which can change the interpretation of the aforementioned results, particularly as regards budget balance. In reality, the revenues can still be lower than the estimated value of tax preferences because it should be remembered that estimations of TEs are static: they usually measure taxes which people save today, but do not take into account the variety of reactions and behaviours that taxpayers might adopt. Besides, the conducted estimations relate only to this particular type of tax in which a given preference exists. It must, nevertheless, be remembered that abolishing one category of TEs can have a fiscal impact on many types of taxes.

#### 4 Conclusion

Just like direct government expenditures, tax expenditures are widely used by governments all over the world. They involve providing assistance to selected groups of taxpayers or types of activity by lowering the tax burden. These are, however, costly, or even very expensive solutions. In the analysed countries, TEs amounted to as much as 43% of total public expenditures and over 11% of the GDP (Finland). Unfortunately, this strongly affects the state of public finances, creating a false impression that public spending and budget deficit are lower than they actually are.

Even though TEs play a similar role to that of direct government spending, they are usually not included in budget reporting, and thus are not strictly controlled. Few countries publish regular reports on TEs. Even in the European Union, where Art. 14(2) of the 2011/85/UE directive obliges countries to issue detailed information on the influence of TEs on public revenues, only 19 of the member states regularly produce such reports (data from 2015).

The conducted analysis allows us to confirm that failure to incorporate tax expenditures in budget reports leads to the unfounded belief that public expenditures are lower than they are in reality, as a result of which the purported budget surplus is only illusory. In nearly each of the investigated countries, inclusion of TEs in budgetary reporting would have caused an increase in the deficit. The only exception is Norway, where TEs are used to a limited extent, while the budget surplus is so substantial that even taking account of TEs would not lead to a deficit. Furthermore, the calculated coefficients of correlation have allowed us to assess the TEs used by particular countries in comparison with direct budget expenditures. We found that these two forms of spending public resources can be regarded as complementary in Finland and Norway, whereas in Poland and Sweden, they are substitutive. From the perspective of the transparency

of fiscal policy, it seems the most advisable that TEs be replaced with direct budget expenditures.

Nevertheless, lack of effective control of TEs can undoubtedly be an incentive for using these instruments in order to evade conventional, far more transparent, expenditures. Tax expenditures are, moreover, a convenient solution which makes it possible to feign reform of the public finance. TEs allow governments to increase the amounts spent on public programmes, even when, officially, they are supposedly curbing expenditure, as is confirmed by the above-presented analysis. All the more so that once they are passed, TEs do not require formal, annual approval, while the procedure of introducing them into the tax system is less complicated than in the case of direct expenditures.

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# Sustainability of Defence Sector and Stability of Defence Expenditures

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## Abstract

National defence, as one of the key instruments of ensuring national security, constitutes a critical element of the public sector. Relevance and ability of defence sector to perform its function and mission relate directly to its capabilities, which, in parallel, correspond to the budget dedicated to defence expenditures. The entire strategic management of defence, articulated through long-term defence planning, with multi-year programs, highly depends on the stability of financing. Especially in the times of unfavorable economic performance, defence sector often becomes one of the first targets for subsequent fiscal constraints. To ensure certain level of stability in defense spending, there is a need to find a way of alleviating austerity in defence budgets through some new concepts, the concepts that should primarily ensure efficiency and better return of investments. In that context, the concept of sustainability may represent an important value added to the way defence sector is doing business, making it more resilient. Based on analyzing effectiveness of stabilization in defense spending in the Czech Republic and the Republic of Croatia between the years 2007 and 2012, the paper aims at pointing out importance of stabilization in defence expenditures as one of the key elements of defence sector sustainability.

*Keywords: defence sector; national defence; defence expenditures; stability; sustainability*

JEL Classification: H56, O11, O25

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## 1 Introduction

National defence arguably belongs to the key instruments of a state for providing national security. Although the meaning of the term “national security” has considerably evolved since its inception in the late 1940s, it stills considers condition both of states (territory, sovereignty) and individuals (citizens). Most importantly, national security, in terms of resources and organization, is still provided by the state. This authority and obligation of a state to produce security make national defence one of the critical elements of public sector. Spending for national security has a special status because it provides prerequisites for social and economic stability and progress, along with preservation of lives and health of citizens as well as protection of democratic principles.

Relevance and ability of defence sector to perform its function and mission relate directly to its capabilities, which in parallel, correspond to the budget allocated to defence. The entire strategic management of defence, articulated through long-term defence planning, with multi-year programs, highly depends on the stability of financing. In the context of defence planning, stabilization (stability) in defence spending is closely linked to the effectiveness of defence sector, viewed as an important factor in developing and maintaining defence capabilities, with direct impact on armed forces deployability and effectiveness [1].

Even the NATO’s 2% of GDP guideline for defence does not seem so demanding on the first sight, yet it required a pledge of Heads of States and Governments during the Wales Summit to reverse the trend of declining defence budgets.

The trend of declining share of national resources allocated to the national defence makes the defence sector in most European countries less and less able to develop capabilities that armed forces need to perform the full spectrum of missions. The issue also represents the challenge for the transatlantic link, since the “burden sharing” issue has long time been the reason for criticism of European allies in NATO.

By the end of the Cold War the defence sector entered into a world of uncertainty, a world without a dominant and well-defined enemy, but a world filled with more amorphous, asymmetric and hybrid threats [2]. At the same time, the fixed costs of R&D for major defence systems continued to grow, both for platforms and for the infrastructure. Developments in the defence industry after the Cold War are characterised by the increasing internationalisation of production, increasing the importance of information technology (hereafter IT) companies and the privatisation of services that were formerly provided by the military [3], the trend known as “spin-off”. Additionally, there is a growing influence of the political determinants (i.e. public opinion) of defence expenditure over security-related and technological ones [4]. Prolonged, inadequate investments in capability development create an unsustainable environment for ensuring the effectiveness and efficiency of the national defence as it requires stability and continuity for its long-term defence planning processes.

As the trends of investments in the defence sector at national level are frequently affected by economic performance and related budgetary contracting, there is a need to find a way of alleviating austerity in defence budgets through some new concepts, the concepts that should primarily ensure efficiency and better return of investments. In that regard, the concepts of sustainability applied to the defence sector and stabilization in defence expenditures show a lot of potential. Based on analyzing effectiveness of stabilization in defense spending in the Czech Republic and the Republic of Croatia between the years 2007 and 2012, the paper aims at pointing out importance of stabilization in defence expenditures as one of the key elements of defence sector sustainability.

## **2 Material and Methods**

The following analyses provide results of the research based on the examination of the key policy and strategic documents and reports related to defence and national security in Croatia and Czechia respectively. Particular focus is given to a review of defence spending history and their stabilization attempts in both respective countries between 2007 and 2012, i.e. the period prior, during and upon global financial crisis, affecting economic performance as well as public finance conditions (not only) in both analysed countries. This short historical survey focuses on defence spending amounts declared in respective national strategic documents and reality in defence spending as recorded by respective national authorities (central government budget). Discrepancies identified when comparing declared and actual spending amounts were used as an argument for understanding stabilization in defence spending as one of the layers of sustainability in defence sector. Therefore, the provision of theoretical framework and empirical data aims at provisioning of approaches and concepts that alleviate and stabilize the long term defence planning, making it more resilient.

### **2.1 *Stabilization in Defence Spending***

Stabilization in defence spending can be viewed as an implementation of a mechanism (e.g. legal or administrative) that enables for at least medium-term predictability of spending amounts in relation to given armed forces development plan. Thus, stabilization in defence spending does not necessarily mean fixation of certain absolute or relative spending amount but any instrument or mechanism, implementation of which contributes to predictability and guarantee of future spending amounts. Therefore, stabilization in defence spending is essential, mainly in relation to the process of planning of defence capabilities development and reproduction. Due to long-term nature of this planning process, its effectiveness is conditioned by the predictability of resources allocated to defence. Stabilization in defence expenditures can be classified from different perspectives. First, it is the perspective of the scope of stabilization. So, stabilization can affect defence expenditures as a whole (general or overall defence expenditures stabilization) or stabilization might focus just on a certain component of defence expenditures, e.g. investment expenditures, R&D expenditures (targeted or partial stabilization in defence expenditures).

Another perspective, when classifying defence expenditures stabilization, considers the variety of instruments and approaches applied when stabilizing defence expenditures as a part of public spending. From this point of view, stabilization can set either fixed amounts of future spending levels (absolute stabilization in defence expenditures), or relative future spending levels, linked to the future development of certain indicator, e.g. gross domestic product, size of the population, overall government spending etc. (relative stabilization in defence expenditures). In addition, instead of future expenditures, stabilization instruments can aim at future incomes. In this case, a certain type of future public incomes, e.g. certain category of taxes, profits generated by government-run enterprises are predetermined to be used (spent in favour of) defence (income based stabilization).

The third perspective when classifying stabilization in defence expenditures is connected with the way the stabilization instruments described in the paragraph above are being implemented. Governments may use either legally binding or unbinding mechanisms to implement stabilization instruments. Legally binding mechanisms consist of law and government regulations (legally binding stabilization in defence expenditures), legally unbinding mechanisms contain mainly declaratory and administrative actions and measures (declaratory stabilization in defence expenditures) [5].

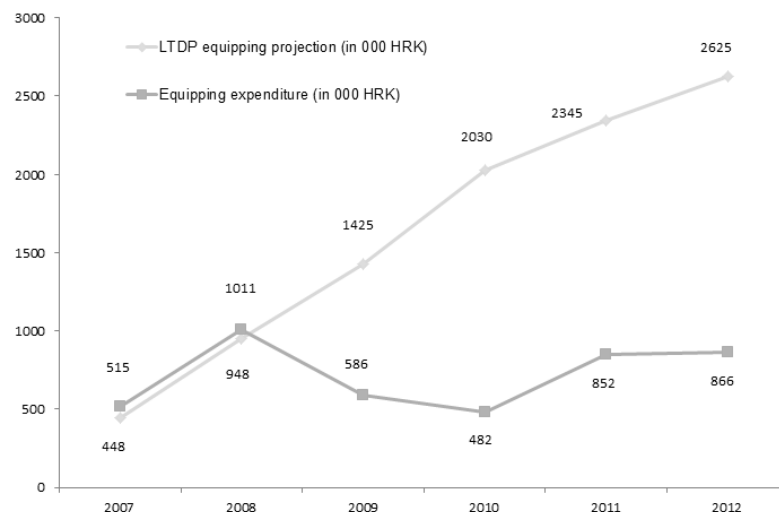
In practice, stabilization in defence expenditures can represent a mix of individual forms of stabilization shown in the below (Table 1), reflecting political decision and procedure generally applied to public expenditures.

**Table 1. Classification of Stabilization in Defence Expenditures (Source: own)**

Approach to Stabilization Classification	Form of Stabilization	Form of Stabilization	Form of Stabilization
Scope of Stabilization	General/overall stabilization	Targeted/partial stabilization	-
Sort of stabilization instruments setting future spending levels	Absolute stabilization	Relative stabilization	Income-based stabilization
Way of implementation of stabilization instruments	Legally binding stabilization	Declaratory stabilization	-

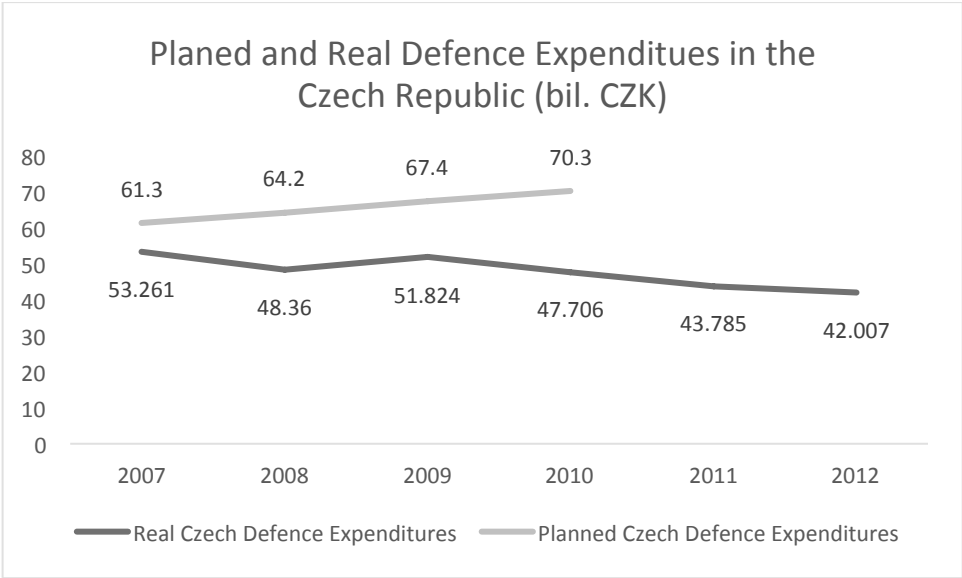
In the case of Croatia, stabilization efforts represented declaratory and partial absolute option, aimed on just investment (defence acquisition) expenditures, expressed in the first Croatian Armed Forces Long-Term Development Plan 2006-2015 (LTDP), which was endorsed primarily to guarantee the required level of the Croatian Armed Forces modernization.

**Figure 1: Funds spent vs. funds projection between 2007 and 2012, for major defence acquisition expenses according to the Croatian Armed Forces Long-Term Development Plan 2006-2015 (Source: own, adapted from data from the Croatian MoD website ([www.morh.hr](http://www.morh.hr)) and the Croatian MoD Annual Reports on Defence (years 2007-2012))**



Between 2007 and 2012, development of defence expenditures in the Czech Republic was characterized by a declaratory and overall absolute stabilization in defence expenditures, resulting from the Concept of the Professional Army of the Czech Republic Development and Czech Armed Forces Mobilization, Reviewed to a Changed Resources Framework, setting fixed amounts of future defence expenditures for the years 2004 – 2010 [6].

**Figure 2: The Czech Republic Real Defence Expenditures spent vs. funds projection between 2007 and 2012, as set in the Concept of the Professional Army of the Czech Republic Development and Czech Armed Forces Mobilization, Reviewed to a Changed Resources Framework (Source: Own calculation based on www.acr.cz)**



### 3 Results and Discussion

The result of analysis of the recent Croatian defence expenditure dynamics shows an enthusiastic approach during the development of the first LTDP, which represented an attempt to stabilize absolute amounts of investment (armament) expenditures within the defence budget, designed to provide for sustainable modernization of the Croatian Armed Forces, reflecting national ambition to integrate in NATO. The economic crisis that hit the USA and the majority of European countries in 2008 and 2009 also had an impact on Croatian economic stability.

Similarly, the situation can be tracked in the Czech Republic, where after a series of more or less unsuccessful attempts to stabilize defence expenditure as a relative share of GDP, the 2013 Armed Forces Development Concept set a commitment of future absolute and overall defence expenditures values. After 2009, the impacts of economic crisis and the efforts of the government to stabilize overall public finance overweighed the previous plans to stabilize the situation in the Armed Forces, especially with regard to its armaments and modernization.

To ensure its relevance, national defence has to be robust and agile enough to respond to the threats and challenges, in the regional and global security environment. The most powerful instrument at national disposal for providing national security, although not effective against all type of threats, are its armed forces that need capabilities for providing security. Stability of the defence spending is crucial for achieving objectives of the armed forces long-term development plans. An adequate defence and security policy development should eliminate the supposed opposition of budgets and strategy. National security strategy and military strategy, therefore,

should be focused on mapping a way forward through a field of constraints, including financial ones [7]. Similarly to societies or companies in the world of business, defence sector has to improve its organizational resilience and, currently, one of the best ways to do that is to adopt and implement sustainability as a core concept. As there is no particular scoping of the concept it may be introduced and implemented wherever decision makers deem necessary and beneficial.

### 3.1 Analysis of Recent Croatian and Czech Defence Expenditure Dynamics

After 2000, the Croatian defence expenditures reflected the economic performance of the country and in particular, its ambition to integrate into Euro-Atlantic structures. This ambition generated requirements to modernize the Croatian Armed Forces, to gradually replace existing obsolete, mainly Soviet technology based armaments and C3 systems to more advanced NATO-interoperable level. Subsequently, these requirements resulted in a demand for stable defence spending, defence investments in particular.

The first Croatian Armed Forces Long-Term Development Plan 2006-2015 (LTDP) was endorsed primarily to guarantee the required level of the Croatian Armed Forces modernization. However, following economic development after 2009, it turned out to be financially unsustainable.

As a consequence, this dynamics severely affected acquisition programs, particularly medium and smaller projects, to ensure that major contracts (e.g. Armoured Personal Carrier with Finland's Patria) will continue without consequences. In these circumstances, some other important key acquisitions, such as the Multirole Combat Aircraft, have also been postponed. Besides acquisition, the defence budget declining affected the funding available for training and exercises, sentencing the process only to smaller and computer aided exercises.

As indicated in the Figure 2, real amounts of Czech defence spending fell deep below the thresholds declared by the Concept. Especially since 2009, impacts of declined economic performance, connected with deteriorating condition of Czech public finance resulted in resignation to any further efforts to stabilize Czech defence expenditures, which lasted until 2014. Differences between the projected and real defence expenditure levels for individual years range from 13 % to 33 %. The significance of this difference impacted all major spending categories but primarily resulted in substantial decrease in investment expenditures (drop from 28 % in 2007 to just 14 % in 2010, with further reduction in following years) [8].

### 3.2 Sustainability in Public Sector – a Theoretical Framework

The term sustainability has different meanings in different contexts. Varying definitions reflect the values and needs of the particular organisation, person or society. It is usually considered as a concept or set of principles. The underlying idea of the concept relies on the term *sustain* that means to keep up and prolong the current way of functioning.

The term sustainability is usually associated with the term *sustainable development*, which has its origins in the so-called "Brundtland Report", the Report of the World Commission on Environment and Development "Our Common Future" to the General Assembly of the United Nations. The Report describes the sustainable development as a development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" [8]. The majority of debate, research and action have still focused on the environmental aspects. It is understandable as an initial step, but an evolved framework for analysis considers the three pillars of sustainability: economic, social and environmental. The main premise of sustainability concept is that every solution should solve multiple problems, while causing no new ones. Sustainability demands a balancing of the ecological, social and economic concerns in decision making [9]:

- Ecological considerations: the maintenance of essential ecological processes and life support systems, and the protection of biodiversity.
- Social considerations: human health and wellbeing, equity, social justice, and public participation.

- Economic considerations: economic growth, efficiency and diversification, international competitiveness, and cost effective policies.

While the implementation of all these principles “as is” may not be applicable for defence sector, its main aspects have already been introduced in policy documents and decisions of some most powerful militaries in the world (e.g. USA, UK etc.).

### 3.3 Sustainability in Public Sector – Sustainable Procurement

The concept of sustainability has already found its place in public sector, applied, among others, on procurement. The European Union’s Sustainable Development Strategy [10] emphasizes the economic, environmental and social factors in analysing the impact of sustainable procurement on the purchasing and supply chain environment. EU promotes the Green Public Procurement (GPP) concept, which is a voluntary instrument for facilitation of the EU's efforts to become a more resource-efficient economy.

In general, procurement is seen, more and more, as “one of the key drivers of change in any organisation, whether public or private sector, and is increasingly becoming a mechanism for policy delivery” [11].

### 3.4 Sustainability in Defence

The very notion of national defence has usually been associated with the capability to wage an armed conflict, primarily to defend a country and its national and security interests. The major expectation from a national defence has traditionally been to be effective, not necessarily efficient. Energy efficiency and reduction of fossil fuels consumption, environmental protection or sustainable procurement are usually not the first attributes coming to people’s minds when they think of the military [12]. In fact, use of energy or material as well as environmental damage are factors that influence military operations in both the short and the long term [13]

Expectations from sustainability in relation to national security may have two dimensions, the one oriented towards supporting long term national goals such as availability of resources, production, economic stability, environmental protection, socio-political sustainability of a society and the other goals, oriented towards the sustainability of a national defence itself (acquisition and procurement, operational energy sustainment etc.). The former may be explained as a function of efficiency and resilience of the system [14], which is particularly important for engaging in military operations. Besides sustainability in military operations, implementation of sustainability practices may also be taken as an important step towards optimisation of defence outputs [15]. In general, defence sectors in several countries (e.g. USA, United Kingdom, and Australia) identified operational, financial, and environmental benefits they had seen in industry and communities which implemented sustainability approaches [16].

In USA, in the beginning of the 2000s, US Army decided to implement sustainability practices not only as a distinct program or initiative within the Army but “an organising principle integrated into everything the Army does to support its mission, including planning, training, equipping, and operations” [17]. The goal of this effort is greater operational effectiveness, measured in terms of endurance, agility, flexibility, resilience and force protection. The means to achieve objectives set in the strategy are energy management, diversification, increased efficiency and demand reduction, all leading to an affordable, sustainable force. Sustainability represents an important factor in developing and maintaining defence capabilities since it may have a huge impact on potential effectiveness and deployability in a long-term perspective. The US Department of Defense (DoD) in its Strategic Sustainability Performance Plan (SSPP) sets a very ambitious vision of sustainability as “to maintain the ability to operate into the future without decline – either in the mission or in the natural and built systems that support it” [18]. Currently, the cornerstone of the US Army’s effort is its Net Zero Strategy. This strategy aims at guiding military installations to produce as much energy on site as it uses, over the course of a year [19].

The British example of the implementation of sustainability, labelled *Sustainable MoD* [20], focuses on several areas: energy efficiency, equipment longevity, capital and maintenance cost, departmental reputation and environmental protection. Similar efforts in other countries, including Canada, Australia, Finland and Denmark are focused, in this phase of the maturity of the concept, on ensuring efficiency (energy), better return of investments (capital and maintenance cost), operational cost reduction and environmental footprint. All these efforts contribute to building the resilience of defence sector, making it less susceptible to stresses from the environment, being it domestic (political, economic) or operational.

#### 4 Conclusion

The defence budget has to be carefully managed, continuously seeking to identify options for significant savings that will not undermine the fundamental security of a country. Both Croatia and Czechia attempted to stabilize defence expenditures - Croatia investments spending, Czechia overall budget, both declared absolute amounts of future spending levels at legally unbinding (declaratory base) to ensure adequate transformation of the armed forces, reflecting a military-political ambition to become and remain a fully integrated and reliable NATO ally. Stability of defence expenditures is the only guarantee that the long-term projects of capability development, which are very susceptible and vulnerable to sudden changes and fluctuations, will be realized on time and be used to respond to security challenges and threats (both as a means of deterrence and, potentially, means of defence).

Negative economic conditions, particularly the economic crisis of 2008/2009 generated situation of austerity in which provision for social and economic needs of society (in public sector) crowded out efforts to provide financial means for the planned capability development of armed forces. Being NATO members, both countries enjoy the guarantee of collective defence but the membership also put them in risk to become “free-riders”. Even though the general economic conditions got better by the time the defence expenditure in both countries are still at the lower level than is necessary to contribute to collective achievement of the level of ambition set in NATO.

To improve the situation, governments may require changing the way how country produces and uses its military power. The new approaches and concepts would arguably be welcome in supporting this effort. The concept of sustainability, with its economic, social and environmental aspects may provide a good and long-term resilience of the defence sector. The best practices so far have shown that the approaches focused, for instance, on improving energy efficiency and reducing fossil fuel energy consumption can significantly reduce operational costs and make defence sector less dependent on resources from the “outside world”. Novel approaches include new strategic culture. It is visible in concepts like sustainable procurement that looks for generating benefits not only to the organisation but the broader society.

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# Tax Expenditures as a Redistributive Tool in Poland

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## Abstract

One of the main functions of the public sector is the redistributive function. There are several reasons justifying the state's inclusion in the sphere of distribution of income. The most important of them is the postulate of fairness, which is treated as an economic category. Public revenues and public expenditures are normally considered to be a standard instrument of redistribution but there is another one (specific) tool which is usually not taken into account in budget process – tax expenditure. Tax expenditures (TEs) are a kind of tax preferences which reduce tax liabilities. Therefore tax expenditures are a kind of spending instruments in public revenue system. The aim of the research is the analysis of the redistributive function of the state in the tax expenditures context. In the paper authors decided to explore the scope of redistribution in Poland. To realize so formulated objective a descriptive method and the method of comparative analysis was used (for the years 2009-2014). The study has been conducted mainly on the basis of literature and empirical data from Ministry of Finance Republic of Poland (MF). It could be concluded that the inclusion of tax expenditures as public spending significantly affects the scope of redistribution of the state. If the TEs are treated as direct expenditure equivalent their total amount become higher. In Poland during the analyzed period the average level of public expenditure was 48.55% of GDP. After adding TEs to general government expenditures the scope of redistribution increased by 4.95 percentage points (average). It is worth noticing that after including TEs in national accounts the scope of redistribution in Poland compared to EU-28 countries is at the average level (before adding – below the average level). This phenomenon can be called a hidden welfare state, because tax expenditures are largely invisible to citizens, policy makers and academics, however, they are made in parallel to direct expenditures for many social purposes. In general the examining the scope of public redistribution should consider the off-budget expenditures such as tax expenditures.

*Keywords: tax expenditure; redistributive tools; tax expenditures in Poland*

JEL Classification: H23, H24, H53

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## 1 Introduction

Nowadays, the share of public sector in the economy is an unquestionable fact. Among the many functions of the public sector – redistribution is probably the most important function of most modern governments and serves to equalize the differences in the level of income, and therefore a more even distribution of wealth. Redistribution means the shifting of resources from some groups in society to the others. Apart from standard instruments of redistribution such as public revenues and public expenditures there is another one, which is usually not taken into account in budget process, in public accounts, and it is not reported – tax expenditure. Tax expenditures (TEs) are a kind of tax preferences which are used to support specific activity or a group of taxpayers by reducing tax liabilities. Government by using allowances, exemptions, rate relief, tax deferral or tax credits treats public revenue system as hidden spending programs.

As it has been noted before the government usually uses the public revenues and the public expenditures to redistribution. However, tax expenditure are actually a hidden form of public expenditure and such situation implies that the standard analyses of the scope of redistribution are burdened with errors because they do not pay attention to “the back door” expenditures. It must be remembered that TEs are only one of the many instruments which allow government to make state hidden. Public expenditures that “escape” from the budget process are defined as “off-budget” and “back-door”. The common feature of these expenses is making them “back door”, i.e. outside the budgetary procedure, usually without taking into account in budgetary laws [22].

The aim of the research is the analysis of the redistributive function of the state in the tax expenditures context. In the paper authors decided to examine the scope of redistribution in Poland using relation between budget expenditures and GDP. The main research question concerns the changes in the size of redistribution in Poland if tax expenditures will be taken into account.

## 2 Material and Methods

As many economists suggest, the existence of the public sector in the economy is justified by the occurrence of market failures both in terms of micro- and macro (public goods, externalities, incomplete markets, asymmetric information, poverty, unemployment, inflation, and unfair distribution of income). This is the research field of a normative nature, in which economists seek to answer the question – what the government should do if the market fails? What tools should be used to counteract the imperfections of the market?

According to the great economist R. Musgrave the scope of public finances/public sector is measuring by the following three functions of the government's budgetary policy [6]:

- stabilization function (to secure economic stabilization),
- distributive function (to secure adjustments in the redistribution of income and wealth),
- allocative function (to secure adjustments in the allocation of resources).

Economists stress out, that the activity of the public sector reveals in two spheres – real area and regulative area. Real area embraces of human, material and financial resources of the state. In this area we have allocative, redistributive and stabilization function of the state. The area of regulations includes a number of processes and structures of information and decision-making, including the establishment and execution of the law, state control, etc. In this field the public sector plays the regulative and control function [20]. The scope of activities of the state, and thus the size of government are determined by the level of income and the level of public spending.

The essential function of the public sector is income redistribution. It involves re-allocating the income that allows its more equitable distribution ex-post. N. Accocella believes that redistribution of income can be named the most important of the activities of the state in the economic policy sphere. Fiscal policy, monetary or income policy have an impact on changes in the distribution of income – it may be a desirable or undesirable redistribution [1].

In the light of public choice theory we can discuss redistribution from some very interesting perspectives too. D. Mueller noticed that redistribution could be seen as: insurance or as a public good. It can improve fairness norms or allocative efficiency or can serve to special interests [15]. These are various hypotheses related to redistribution. Redistribution as insurance is referred to the raising of the civil society and creating institutions to redistribute of income from the rich to the poor. The uncertain individual insures herself against the possibility be one of the poor. Uncertainty over future position could lead to include institutions for redistribution in the constitution. In the case of redistribution as a public good the rich are seen as transferring income to the poor, due to empathy or altruistic motivation. Redistribution to satisfy fairness norms is the third hypothesis. The next one concerns to the improvement of allocative efficiency. As Mueller noticed the first three theories of redistribution are based on particular assumptions about people's preferences: risk averse, altruistic or conform to certain norms of fairness. The fourth one assumes that there are differences in the productivities of individuals. Redistribution of incomes and productive resources can lead to improvements in allocative efficiency that make all members of society better off [15]. In economic theory the most popular view on the aim of redistribution is the equalization of the differences in the level of household incomes. The next part of the paper will be devoted to the analysis of tools and methods for measuring redistribution.

The article was primarily written on the basis of a content analysis of literature. For the purposes of the research, both descriptive and comparative analysis methods were employed. The authors used data from the Ministry of Finance Republic of Poland, including data from

reports on tax expenditures and from the Eurostat (data for the years 2009-2014). Due to the fact that TEs are relatively little recognized, especially in the area of empiric research, the authors decided to show how tax expenditures affect the scope of redistribution at the general level, while at the same time noting that this is a growing trend.

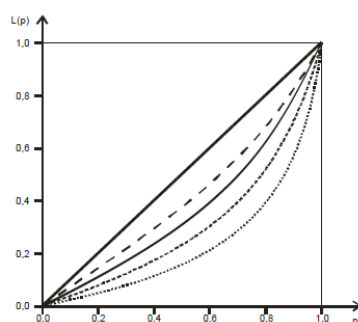
### 3 Results and Discussion

The scope of redistribution varies widely in particular countries. It depends on the concept of the state, the level of decentralization, structures of tax revenues and so on. The scope of redistribution is also measured in different ways. In the literature it can be found measures such as Lorenz's curve, Gini coefficient, Atkinson measure, Dalton measure and standard ratio of budget revenues (or tax revenues) or budget expenditures to gross domestic product (GDP) etc.

An essential tool of income redistribution is the budget, including the public revenues and public expenditures. On the side of public expenditures there are social benefits, while on the public revenue side – personal income tax [2]. Both social transfers, including pensions, unemployment benefits, family allowance and social insurance, social assistance, as well as various types of taxes are the tools by which the state can effectively reduce the differences in the primary distribution of income, and thus affect the maximization of social welfare [10]. Despite those instruments of redistribution another one should be indicated. Taxes are not only collecting revenue's tools in government activity. In the tax system there are instruments being a part of the tax design but they result in lower revenues. These instruments are tax expenditures. As it was mentioned before TEs are used as a fiscal policy tool to achieve non-fiscal goals of government policy. Hence, redistribution is one of such purposes. The idea of redistribution by TEs considering their total amount is not often treated as a subject of the analysis. In the literature some researchers are studying the redistributive effects of particular TEs (such as The Earned Income Tax Credit [9] or Tax Expenditures for Medical Care Expenses or for Retirement Saving [25]), but not as a whole. In 2014 S. Avrama published analysis focused on the distributional effects of personal income tax expenditures [4]. She noticed that TEs are not only a public policy instruments concerned mainly the rich but, what seems to be important, the authoress stated, that their distributional consequences are not necessarily progressive [4].

The simplest approach to measure the redistribution of income is the ratio of public expenditure and public income to gross domestic product (GDP). In the paper the authors used the standard measure of redistribution – the share of public expenditure in GDP, but it is worth to analyse other measures that are used in most research. The first measure of inequality (of income distribution in society) based on the Lorenz function is the Gini coefficient. The measure of inequality based on the welfare function is, however, an Atkinson coefficient. Considering the income distribution, where every household has the same income – distribution is called an egalitarian, completely devoid of inequalities. Measuring inequality, the degree of deviation of the distribution of income from the egalitarian distribution is examined. The Lorenz curve shows the relationship between the cumulative proportion of income and the cumulative proportion of income receiving units then the units are arranged in ascending order of income [13]. The Lorenz function increases monotonically with income increasing and is convex. The Lorenz function shows the presence or absence of income inequality. The Lorenz function also reflects the degree of income inequality. The more the Lorenz function deviates from the egalitarian line, the income distribution is more unequal [18].

**Figure 1. Lorenz Curve and Gini Coefficient (Source: See: Michael P. Todaro, Stephen C. Smith, 2009. *Economic Development*, Addison-Wesley, Harlow England)**



A significant element of inequality analysis is the analysis of inequality in households' income in classic terms of view. For the analysis of inequality Gini coefficient is most commonly used. It has a value in the range [0, 1]. A value of zero indicates a complete equality in income redistribution. The increase in the value of the Gini coefficient up to 1 means that only one household had income – complete income inequality [3].

The Atkinson index (also known as the Atkinson measure or Atkinson inequality measure) is also a measure of income inequality. The measure is useful in determining which end of the distribution contributed most to the observed inequality. This index allows to determine which part of the income distribution changes will be the most sensitive [22].

Additionally Dalton measure identifies the degree of inequality at the global income of the percentage deficiency of actual total amount of maximum utility, understood as the total amount that would have been obtained with an equal distribution of global income [11].

As mentioned earlier, the simplest and most commonly used measures of redistribution are the share of public revenue and expenditure in GDP. In the paper for the analysis the last-mentioned measures was adopted because such an approach gives the opportunity to include TEs to the analysis. However, it should be remembered that this is not the measure of inequality like Gini and Atkinson coefficient but rather the measure of distribution of national income (in general sense).

### 3.1 Tax expenditures as a redistributive instrument

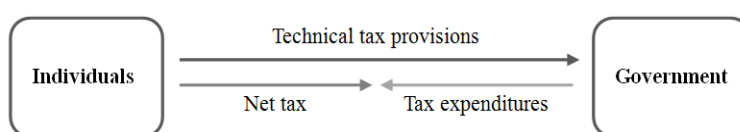
As already noted, TEs are one of the redistribution tools. It is very difficult to categorize TEs because the name of this fiscal institution is related to two different opposite budget categories. In the literature TEs are known as expenses which result from reduction in the basic tax burden. The main point of TEs concept is related to the expenditure nature of taxes. It is very important to understand that taxation is not only revenue tool of the budget. For this reason in the budget statistic TEs could be classified on the revenue side (because TEs are part of the taxation) or on the expenditure side (TEs are included to the "back door" expenditures, because their impact on the budget is the same as in the case of direct spending) [12].

However it is worth to ask what TEs exactly are? S.S. Surrey (law professor at Harvard University and served as Assistant Secretary of the Treasury for Tax Policy under President Kennedy) is considered as the author of TEs concept [19]. Surrey prepared a list of special deductions and exemptions in the U.S. income tax and for the first time use 'tax expenditure' to describe them. Using 'expenditure' in the tax context was not accidental. It is important to present the expenditure nature of tax system using many kind of TEs such as: allowances: amounts deducted from the benchmark to arrive at the tax base; exemptions: amounts excluded from the tax base; rate relief: a reduced rate of tax applied to a class of taxpayer or taxable transactions; tax deferral: a delay in paying tax; credits: amounts deducted from tax liability [17]. As L.E. Burman noted, the main S.S. Surrey's goal was to pay attention to these items, with hope that they will initiate the reform of the tax system in the direction of realizing its main fiscal function [5]. One of the most popular definition of TEs comes from OECD report. TEs has been defined there as "provisions of tax law, regulation or practices that reduce or postpone

revenue for a comparatively narrow population of taxpayers relative to a benchmark tax”. Furthermore, as it was mentioned earlier, for government, tax expenditures are a loss in revenue but for a taxpayer, it is a reduction in tax liability [17]. To sum up, one of the most important part of the TEs analysis is to define the benchmark tax. In practice, many countries which prepare TEs reports define benchmark tax for each type of tax where TEs are identify (Australia, Canada, Sweden, Finland, Poland) [26].

Therefore another aspect of TEs concept is the assumption that not all tax provisions are considerate as TEs (Figure 2). Many of tax provisions, tax exemptions etc. are used to make tax system more efficient and compatible to international regulations. In consequence, technical tax provisions regulations contain such elements as: exemptions to avoid double taxations, amounts deducted from tax liability, exemptions to maintain internal cohesion etc.

**Figure 2. Mechanism of tax expenditures (Source: DZIEMIANOWICZ R.I. 2015. Istota i definicja tax expenditures – aspekt teoretyczny. In Dziemianowicz R.I. (Eds.): *Tax Expenditures jako narzędzie transparentnej Polityki fiskalnej. Definicja, szacowanie i ocena.* Warszawa, CeaDeWu, p. 19)**



Government uses TEs to support selected groups of taxpayers or specific activities. It is done by reduction of tax liabilities. It means that these taxpayers pay lower taxes than the others, so they financial position by reducing public liabilities is better than others. As we can see almost the same results could be achieved by direct public spending. So, why TEs are used? There are many reasons. Generally, it is conditioned by historical issues. It is difficult to say which instrument is better (more effective) in achieving given goals. Theoretically, each legislator should carry out ex-post analysis to assess the effectiveness of proposed solutions and thus choose the most optimal. In many cases it is a kind of trade-off between TEs and direct public spending (the comparison between TEs and direct spending is shown in Table 1).

**Table 1. Public expenditure classification (Source: Villela L., Lemgruber A., Jorratt M. 2010. *Tax Expenditure Budgets. Concepts and Challenges for Implementation*, IDB Working Paper Series No. IDB-WP-131)**

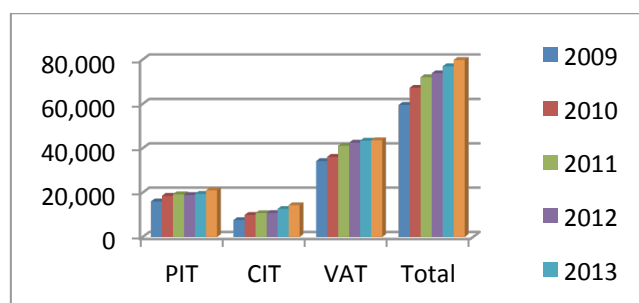
Category	Definition	Transparency
Direct expenditures	Traditional way of public spending, direct transfer of public resources to beneficiaries	Value of transfers is the integral part of the budget act and the year-end reports
Tax expenditures	Special preferential tax structures which reduce tax liability of selected taxpayers to pursue certain social and economic policy objectives	Provisions are integral part of tax code, disclosure in annual reports if published (only in several countries), generally there is no legal obligation of reporting

It can be said that TEs are used for the same reasons as the direct public spending. One of them is the analysed redistribution. However, if there is no right TEs identification, measurement and budget reporting there will not be the correct and actual size of this kind of state activity.

### 3.2 The role of tax expenditures in the redistribution in Poland

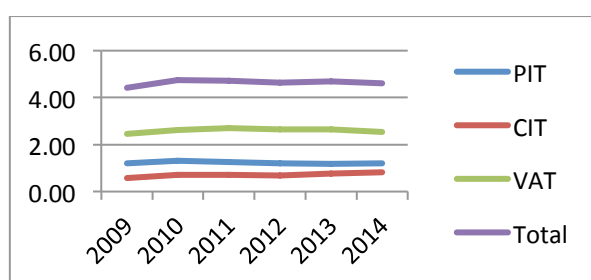
The practice of tax expenditures reporting in Poland is not very long. First report was published by Ministry of Finance in 2010 and it contained data from 2009. Till now MF published six reports covering the period from 2009 to 2014. In Polish practice three groups of taxes are analysed: income taxes (personal income tax, corporate income tax), consumption taxes (value added tax (VAT), excise tax) and local taxes. As it is shown on Figure 3 VAT tax expenditures achieved the highest value.

**Figure 3. Tax expenditures by taxes in Poland (in million PLN) (Source: author's own calculations based on Ministry of Finance Republic of Poland TEs reports)**



The total value of TEs in relation to GDP amounted not more than 5% on average (from 4.42% in 2009 to 4.75% in 2010) and it is rather stable (see Figure 4). However the absolute value increased during the years 2009-2014 from 59.517 million to 79.777 million (in PLN). In euro it was adequately: 13.846 million and 18.559 million (Figure 3).

**Figure 4. Tax expenditures by taxes in Poland (in relation to GDP) (Source: author's own calculations based on Ministry of Finance Republic of Poland TEs reports)**



Compared to other countries, the ratio of TEs to GDP is not very high in Poland. For instance, tax expenditures amounted: in Sweden was amounted 4.28% (2016), in Finland – 11.52% (2016), in Denmark – 2.2% (2009), in Norway – 4.38% (2016), in Australia – 7.7% (2015-16), in Canada – 12% (2013) and in USA – 8% (2015). These are values obtained on the basis of own calculations. International data suggests that the role of TEs in “back-door” public spending varies.

Analysing the scope of redistribution authors decided to use the ratio of general government budget expenditures to GDP and state government budget expenditures to GDP. In Poland during 2009-2014 years general government expenditures were about 43.6% in relation to GDP (see Table 2). If we compare Poland to other countries in the EU-28 it is one of the lowest index (19th place at 28). Taking into account relation between state government expenditures and GDP it was about 25.1% and with TEs – 30.05%.

**Table 2. General government expenditures and tax expenditures in relation to GDP in Poland (%) (Source: author's own calculations based on Ministry of Finance in Poland TEs reports and public accounts)**

	2009	2010	2011	2012	2013	2014
General government expenditures to GDP	44.9	45.7	43.8	42.7	42.4	42.1
Tax expenditures to GDP	4.80	5.10	5.05	5.01	4.64	5.10
General budget expenditures and tax expenditures to GDP	49.70	50.80	48.85	47.71	47.04	47.20
State government expenditures to GDP	25.90	27.50	25.90	24.70	23.90	22.70
State budget expenditures and tax expenditures to GDP	30.7	32.6	30.95	29.71	28.54	27.8

Assuming that TEs are a direct expenditure equivalent, their total amount will be higher. In the analysed period, the average value of general budget expenditures and tax expenditures to GDP amounted 48.55%. After adding TEs to general government expenditures the scope of redistribution have become bigger. It means that Poland now is at the 12th place in the EU-28. The function of redistribution can be effected through the use of various instruments. The study aimed to present tax expenditures as one of them. The main objective of the study was to present that the lack of consideration all dimensions of redistribution causes that its overall dimension is not fully known. Tax expenditures are a special tool to achieve the objectives of the state. They are treated as the equivalent of direct budget expenditures, however, are not properly estimated or monitored. To sum up, public expenditures should take into account estimates of TEs to have a more complete picture of implementation of the redistribution function.

#### 4 Conclusions

Tax expenditures are essentially a decrease of direct payments by the government because they save the government from collecting taxes and then paying money to the society. It causes that TEs become a form of a hidden welfare state. The implication of such a situation is the lack of transparency of public expenditure. It should be noted that the inclusion of tax expenditures as public spending significantly affects the scope of redistribution of the state. If the TEs are treated as direct expenditure equivalent their total amount is higher. In Poland during the analysed period the ratio of general budget expenditures and tax expenditures to GDP was average 48.55% (an average increase of 4.95 percentage points). After adding TEs to general government expenditures the scope of redistribution have become bigger. In the years 2009-2014 Poland ranked the 12th place in the EU-28 (change from 19th place) in this regard.

Compared to other countries, the relation of TEs to GDP in Poland is not very high. In terms of international comparisons, it may be disputed the uniformity of data for identification of TEs and their estimation. Without a uniform definition of this category, making international comparisons is therefore considerably more difficult. For this reason there is an urgent need for further research which will enable the development of a methodology for estimating tax expenditures. Additionally the presented study may contribute to the development of research in this area. Another issue connected to TEs analysis is the place of TEs reports in budget procedure. In authors opinion including those reports to state budget would increase transparency of public policy.

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# The Effectiveness of Fiscal Policy in case of Liquidity Constrains

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## Abstract

The aim the article is to estimate the effects of government spending in case of liquidity constraints. The analysis is based on new Keynesian dynamic stochastic general equilibrium model, which takes into account both optimizing households and households with liquidity constraints. Optimising household make decisions on the basis of permanent income whereas households facing liquidity constraints make decisions on the basis of their current income. The parameters of the model were estimated for economy of the Czech Republic on the basis of Bayesian approach, which takes into account both empirical data and *a priori* assumptions concerning parameters distributions. The results of the study indicate that the share of households without access to the banking sector has significant impact on fiscal multipliers. The impulse-response functions show that the increase in the share of households without access to the banking sector translated into stronger impact of government spending on GDP in the Czech Republic. It means, that there is some trade-off between the effectiveness of fiscal policy as a tool of GDP stabilization within business cycle and households access to the credit market.

*Keywords: fiscal policy; government spending; households; liquidity constraints*

JEL Classification: E62, H31

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## 1 Introduction

The effectiveness of fiscal policy is becoming more and more popular issue in the recent post-crisis macroeconomics literature. As a consequence, dynamic stochastic general equilibrium models, which are nowadays the main tool of the analysis of short-term term macroeconomic policy effects, are becoming more and more elaborated. However, most of dynamic stochastic general equilibrium models concerning fiscal policy still assume that all households make consumption decisions based on the intertemporal optimization. This assumption means that households do not face liquidity constraints. However, as indicated by Galí, López-Salido and Vallés [12], the estimates of fiscal multipliers taking into account heterogeneity of households enable more precise assessment of the effectiveness of fiscal policy.

Thus, the aim the article is to estimate the effects of government spending in the model assuming heterogeneity of households. The analysis was based on new Keynesian model, which takes into account both optimizing households and households with liquidity constraints. Optimising household make decisions on the basis of permanent income whereas households facing liquidity constraints make decisions on the basis of their current income. The model is medium scale dynamic stochastic general equilibrium model in which wage and price rigidities are assumed. We applied the relaxation algorithm in order to solve non-linear model. The parameters were estimated on the basis of Bayesian approach, which takes into account both empirical data and *a priori* assumptions concerning parameters distributions. The research was carried out for the Czech economy. Empirical data comes from Eurostat and *a priori* moments are similar to those assumed by Smets and Wouters [20]. *A posteriori* distributions were calculated using Metropolis-Hastings algorithm [13].

It should be noted that conclusions from previous empirical research for euro area (e.g. [8]) cannot be easily adopted for Central and Eastern European countries, because the share of non-Ricardian households with liquidity constrain is higher in CEE countries than in euro area [15]. The credit market in the Czech Republic in comparison with most countries of euro area is relatively underdeveloped, which translate into a larger share of households with no access to the credit market. Moreover, the average income in Czech Republic is lower than average income

in euro area, what, as indicated by Mankiw [16], generates a higher share of non-Ricardian households.

The proceeding is organized as follows. In the next section the assumptions of the new Keynesian model with heterogeneous households are presented. In the next section the estimates of the parameters are shown which is followed by the presentation of the empirical results of the study. The concluding remarks and the scope for further research are presented in the last section.

## 2 Material and Methods

The analysis is based on the New-Keynesian dynamic stochastic general equilibrium model. There are two groups of households in the model. The fraction  $\varpi \in (0,1)$  of the continuum of households indexed by  $j \in [0,1]$  faces liquidity constraints. These households make decisions only on the basis of current income. They are called the non-Ricardians, because they do not behave according to Ricardian equivalence. In case of this group of households the budget constraint takes the form:

$$P_t C_t^{NR} + P_t T_t^{NR} = W_t P_t L_t^{NR}, \quad (1)$$

where:  $C_t^{NR}, L_t^{NR}$  - non-Ricardians consumption and labour supply respectively,  $T_t^{NR}$  - taxes paid by non-Ricardians,  $W_t$  - wages,  $P_t$  - price.

Non-Ricardians maximize the following utility function:

$$u = \ln C_t^{NR} - \frac{(L_t^{NR})^{1+\varphi}}{1+\varphi}, \quad (2)$$

where:  $\varphi \geq 0$ .

Thus, the labor supply of non-Ricardian households must satisfy the following intra-temporal condition:

$$W_t = C_t^{NR} (L_t^{NR})^\varphi. \quad (3)$$

The second group of households have access to capital market. These households, called Ricardians, optimize consumption according to Ricardian equivalence, as in seminal Barro paper [3]. They face the following intertemporal budget constraint:

$$P_t (C_t^R + I_t) + \frac{B_{t+1}}{(1+r_t)} + P_t T_t^R = W_t P_t N_t^R + (1+r_t^k) P_t K_t^R + B_t + D_t, \quad (4)$$

where:  $C_t^R, I_t, B_t$  and  $K_t$  - Ricardians consumption, investment, bonds capital respectively,  $T_t^R$  - taxes paid by Ricardians,  $D_t$  - dividends paid to firms owned by Ricardian households,  $r_t, r_t^k$  - return on bonds and capital respectively.

Optimizing households maximise the expected value of the sum of discounted utilities given by:

$$E_t \left( \sum_{t=0}^{\infty} \beta^t \left( \ln C_t^R - \frac{(L_t^R)^{1+\varphi}}{1+\varphi} \right) \right), \quad (5)$$

where:  $\beta \in (0,1)$ .

Only optimising households accumulate capital. In case of this group of households the capital accumulation equation is as follows:

$$K_t = (1 - \delta)K_{t-1} + \left( f\left(\frac{I_t}{K_{t-1}}\right) \right) I_t, \quad (6)$$

where:  $\delta \in (0,1)$  and function  $f$  fulfils:  $f(\delta) = \delta$ ,  $f' > 0$ ,  $f'(\delta) = 1$ ,  $f'' < 0$ .

On the basis of the above assumption one can get the following conditions of discounted utility maximization:

$$E_t \left( \beta \frac{C_t^R}{C_{t+1}^R} \right) = \frac{1}{1 + r_t}, \quad (7)$$

$$E_t \left( \beta \frac{C_t^R}{C_{t+1}^R} \left( 1 + r_{t+1}^k + \left( f'\left(\frac{I_{t+1}}{K_{t+1}}\right) \right)^{-1} \left( 1 - \delta + f\left(\frac{I_{t+1}}{K_{t+1}}\right) - \frac{I_{t+1}}{K_{t+1}} f'\left(\frac{I_{t+1}}{K_{t+1}}\right) \right) \right) \right) = P_t \frac{I_{t+1}}{K_{t+1}} \left( f'\left(\frac{I_{t+1}}{K_{t+1}}\right) \right)^{-1} \quad (8)$$

The final good ( $Y_t$ ) is produced based on continuum of intermediate goods indexed by  $i \in [0,1]$ , according to Dixit and Stiglitz aggregator [10]:

$$Y_t = \left( \int_0^1 y_t(i)^{\frac{1}{1+\lambda_p}} di \right)^{1+\lambda_p}, \quad (9)$$

where:  $y_t(i)$  - intermediate good of type  $i$ ,  $\lambda_p$  - mark-up in the goods market.

The production function of intermediate good  $i$  takes the form:

$$y_t(i) = A_t k_t(i)^\alpha l_t(i)^{1-\alpha} - FC, \quad (10)$$

where:  $A_t$  - total factor productivity,  $k_t(i)$ ,  $l_t(i)$  - capital and labour hired to produce intermediate good  $i$ ,  $FC$  - fixed costs,  $\alpha \in (0,1)$ .

The total factor productivity changes according to the autoregressive process:

$$A_t = (1 - \rho_A)\bar{A} + \rho_A A_{t-1} + \xi_{A,t}, \quad (11)$$

where:  $\rho_A \in (0,1)$ ,  $\bar{A} > 0$ ,  $\xi_{A,t} \sim N(0, \sigma_A^2)$ .

Prices are set according to the Calvo schedule, that is price is optimised in a given period with probability  $1 - \xi_p$  [4]. Thus, the equation describing price dynamics is given by:

$$P_t = \left( (1 - \xi_p) P_t^* \frac{1}{\lambda_p} + \xi_p P_{t-1} \frac{1}{\lambda_p} \right)^{-\lambda_p}, \quad (12)$$

where:  $P_t^*$  - price optimized at time  $t$ ,  $\xi_p \in (0,1)$ .

The budget constraint of government is given by:

$$P_t T_t + \frac{B_{t+1}}{(1+r_t)} = B_t + P_t G_t, \quad (13)$$

where:  $T_t$  - taxes,  $G_t$  - government spending.

Taxes consist of taxes paid by both Ricardians and non-Ricardians:

$$T_t = \varpi T_t^{NR} + (1-\varpi)T_t^R. \quad (14)$$

Similarly as Chung, Davig and Leeper [7] or Davig and Leeper [9] it is assumed that taxes adjust to fulfil the fiscal rule given by:

$$T_t - T^* = \phi_{g/y}(G_t - G^*) + \phi_{B/y} \left( \frac{B_t}{P_{t-1}} - \frac{B^*}{P^*} \right), \quad (15)$$

where:  $T^*$ ,  $G^*$ ,  $B^*$  and  $P^*$  is steady state level of taxes, government spending, bonds and price respectively,  $\phi_{g/y}, \phi_{B/y} > 0$ .

Fiscal policy affects the economy through shocks to government spending. Spending shocks follow a first-order autoregressive process:

$$\frac{G_t - G^*}{Y^*} = \rho_G \frac{G_{t-1} - G^*}{Y^*} + \xi_{G,t}, \quad (16)$$

where:  $\rho_G \in (0,1), \xi_{G,t} \sim N(0, \sigma_{\varepsilon, G}^2)$ .

The monetary policy follows simple Taylor rule [21], that is:

$$r_t = r^* + \phi_\pi \pi_t + \varepsilon_{r,t} \quad (17)$$

where:  $r^*$  - steady state interest rate,  $\pi_t$  - inflation,  $\varepsilon_{r,t}$  - monetary policy shocks,  $\phi_\pi \geq 0$ .

Interest rate shocks follow a first-order autoregressive process:

$$\varepsilon_{r,t} = \rho_r \varepsilon_{r,t-1} + \xi_{r,t}, \quad (18)$$

where:  $\rho_r \in (0,1), \xi_{r,t} = N(0, \sigma_R^2)$ .

The model is closed by standard equilibrium condition on goods market, that is output equals the sum of demand by households for consumption and investment and demand by government:

$$Y_t = C_t + I_t + G_t. \quad (19)$$

### 3 Results and Discussion

Parameters of the model were estimated on the basis of quarterly data for the economy of the Czech Republic for the period Q1 1999 – Q4 2016. Bayesian methodology was applied to estimate most of the parameters of the model. Bayesian estimation is based on *a priori* information concerning parameters distribution and enables to take into account knowledge

about the economic phenomena and is relatively robust to model specification errors [11]. The following *a priori* means of structural parameters were assumed:

- the same share of Ricardian and non-Ricardian households [5],
- the elasticity of output with respect to capital at standard level equal to 0.33,
- price markup equal to 0.2 [19],
- the average price duration of one year,
- the elasticity of investment-capital ratio with respect to Tobin's Q ratio equal to 1 [14],
- the elasticity of wages with respect to hours equal to 0.2 [19],
- the fiscal policy rule parameters at levels assumed by Galí, López-Salido and Vallés [12],
- the parameter in Taylor rule equal to 1.5 [21],
- the parameters describing persistency of shocks equal to 0.9.

Calibration, as commonly applied in DSGE models, was only used in case of the discount factor and the rate of capital depreciation. The discount factor and the rate of capital depreciation were calibrated on standard levels used in the literature (e.g. [20]), thus:

- discount factor was set to 0.99,
- depreciation rate was set to 0.025.

*A posteriori* distributions were calculated using Metropolis [17] and Hastings [13] algorithm [1]. There are three shocks in the model (one supply-side and two demand-side shocks), thus no more than three observable variables are possible for estimation. The estimation covered the following observable variables for the Czech economy: GDP, employment, and private consumption. Quarterly data which comes from Eurostat were used in the estimation.

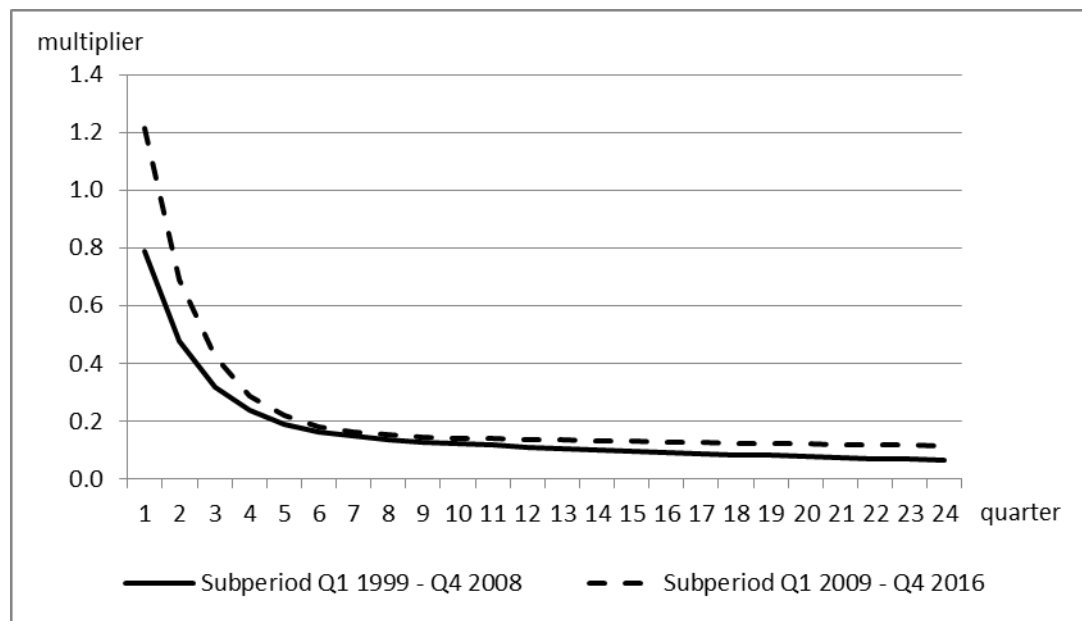
Model was estimated for two sub periods: Q1 1999 – Q4 2008 and Q1 2009 - Q4 2016, that is before Great Recession and after the crisis begun. All variables were transformed into logarithmic form and then seasonally adjusted. The Hodrick-Prescott filter with the standard smoothing parameter for quarterly data was used to remove the trend. Numerical calculations were made using the Dynare software based on Matlab. It was obtained that after the Great Recession begun the share of non Ricardians increased, that is there was higher share of households with liquidity constraints.

On the basis of *a posteriori* estimates of the parameters the effects of fiscal policy in the Czech Republic before and after Great Recession begun were analysed. The analysis was based on impulse-response functions for two sub-periods:

- Q1 1999– Q4 2008;
- Q1 2009 - Q4 2016.

The comparison of the effects of one standard deviation government shocks on GDP before and after the crisis is shown in Figure 1.

**Figure 1. The impact of government spending shocks on GDP in the Czech Republic (Source: Author)**



The comparison presented in Figure 1 shows that the share of non-Ricardian households has significant impact on fiscal multipliers. After crisis, when the share of non-Ricardians was relatively high, the impact of government spending shocks on GDP was about 50% stronger than before Great Recession. Thus, the results of the research, showing that fiscal multipliers are higher during recession than expansion, are in line with results for United States or Eurozone (e.g. [2], [6]).

The results showing that the effectiveness of fiscal policy in the Czech Republic depends on the phase of the cycle enhance arguments for anticyclical fiscal policy. Within anticyclical fiscal policy government spending increases during recessions and decreases during expansions. In case of heterogeneous effectiveness of fiscal policy the impact of anticyclical fiscal policy on output is different during different phases of the cycle. On one hand, during recessions, because of relatively high multiplier, the expansionary fiscal policy significantly increases output. On the other hand, during expansions, because of relatively low multiplier, the decrease in government spending does not generate so significant decrease in output.

#### 4 Conclusion

The results of the research indicate that the access to the banking sector influences fiscal policy effectiveness. The impulse-response functions show that the increase in the share of households without access to the banking sector translated into stronger impact of government spending on GDP in the Czech Republic. It means, that there is some trade-off between the effectiveness of fiscal policy as a tool of GDP stabilization within business cycle and households access to the credit market.

The results have important economic implications in the context of potential future access of the Czech Republic to Eurozone. Fiscal policy is a key macroeconomic tool in case of asymmetric shocks, because monetary policy is responsible only for mitigating GDP fluctuations in case of shocks affecting whole monetary union. Thus, the effectiveness of fiscal policy is an important factor influencing the balance of pros and cons of euro adoption. In the Czech Republic, because of a high share of non-Ricardians, fiscal multipliers are relatively high, which may be indicated as potential argument for accessing euro. On the other hand, the share of households with liquidity constraints will presumably decrease as the GDP per capita will

increase in the Czech Republic. This means that the effectiveness of fiscal policy in stabilizing macroeconomic fluctuations will presumably decrease in time.

However the effectiveness of fiscal policy is of course only one of the factors influencing the balance of pros and cons of the Czech Republic access to Economic and Monetary Union. In particular optimal currency area conditions should be fulfilled [18]. Moreover, the access to Eurozone should be analysed taking into account not only economic consequences but also social and political dimensions of euro adoption.

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# The Factors Influencing Sub-federal Budget Revenues: Russian Case Study

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## Abstract

The objective of this research is theoretical and practical analysis of the factors determining sub-federal budget revenues based on the pooled data of 80 Russian regions in 2006-2015. For its accomplishment we developed a model showing dependency of collected tax revenues per capita in regions on the labor productivity, the share of employees and the tax return in main economic sectors adjusted for the total level of employment in regions. Its decomposition using mixed factor analysis allowed us to determine contribution of these factors to change in total tax revenues per capita and to detect the unprecedented role of productivity in mining and quarrying activity. To identify impact of redistributive factors of budgetary system we proposed a regression model demonstrating dependency of total budget revenues per capita on total tax revenues per capita, the share of own regional taxes in total tax income and the share of interbudgetary transfers in total budget revenues. Taking into account the Pseudo-Poisson distribution of dependent variable, we used the maximum-likelihood method for estimating the model. The resulting coefficients indicated two times higher elasticity of budget revenues with respect to collected taxes and share of own revenues than to transfers of federal center.

*Keywords: region; budget revenue; factors; sectoral GRP per capita; elasticity*

JEL Classification: H20, H61

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## 1 Introduction

Russia is a typical example of large federal state with substantial natural and climatic diversity across its territories, accompanied by differences in their economic potential and trends of development. Indeed, in 2015 the gap in GRP per capita between the leading region - Sakhalin Oblast (with 1700.1 thousand rubles per capita) and the most backward region - Republic of Ingushetia (with 116 thousand rubles per capita) amounted to 14.7 times, while country average was 444 thousand rubles per capita. The range of collected tax revenues per capita in 2015 was even higher - 90 times (with a maximum of 741.4 thousand rubles in the Tyumen Oblast and minimum of 8.2 in Chechen Republic). Meanwhile, the tax rules in the Russian Federation are applied in such a way that the most profitable and unevenly distributed taxes go to the federal center. As a result, at the stage of taxes sharing among the levels of the budgetary system, the gap in own tax revenues of the Russian regions is reduced to 46.5 times. The average share of non-tax revenues in total budget revenues of Russian regions does not exceed 7%; moreover, rich regions have natural advantages in attracting them. Therefore, non-tax revenues have a minor effect on inter-regional differences in budget provision. Meanwhile, the second significant reduction in interregional disparities in budget revenues (after the taxes sharing) occurs at the stage of distribution of the federal budget transfers among the sub-federal entities. In 2015 the average share of inter-governmental aid in the total revenues of regional budgets reached 28.7% allowing to decrease the gap in the budgetary provision of sub-federal budgets up to 14.7 times.

Analysis of the budget revenues of Russian regions indicates importance of the sectoral structure of the economy for the level of budget provision of Russian regions. Additionally, it is significantly affected by institutions of the fiscal system aimed at equalizing the budgetary provision of the regions, which are worked out to meet the regions' need for financing social mandates. At the same time, other institutions aimed at stimulating economic activity can reduce the regional budget revenues. For instance (for example), preferential tax regimes can be

established within the regions where special economic zones operate. Currently, there are 24 special economic zones in Russia of the following types: industrial, technology-innovative, tourist-recreational and port. The third group of factors is connected with the behavior of the population and enterprises, different levels of tax evasion in the regions. Ideally, a study of the revenues of regional budgets should take into account all these circumstances. In our research, we identify those which are most relevant from the standpoint of deterministic factor and econometric analysis.

## 2 Literature Overview

An analysis of the factors determining the level of incomes of sub-federal governments has been undertaken by numerous economic studies concerning both Russia and other federal states.

One group of researchers studied influence of macroeconomic factors (oil prices, exchange rate, inflation and economic growth) on the formation of budget revenues at different levels of budget system. Some authors suggested use of the vector autoregression method and the impulse response function to isolate the mutual influence of macroeconomic factors on budget revenues and thereby to solve the endogenous problem inherent in such models [1]. Other authors primarily studied the institutional and behavioral factors of budget revenues, effects of business-cycles, level of corruption [15], tax evasion and audit enforcement [3].

Another strand of literature was related to the study of impact of fiscal redistribution on available resources and motives of sub-federal authorities, economic growth and budget revenues in the short and long run. Thus, Breuillé and Vigneault [2] have shown the negative impact of budgetary redistribution, purposed for equalization of the regional budgets provision, on the level of financial discipline. At the same time, Huber and Runkel [4] have demonstrated different influence of soft budget constraints on donors' behavior and tight budget constraints on recipients' behavior. Kappeler, Solé-Ollé, Stephan and Väilä emphasized that intergovernmental transfers directed to public goods production and investment of regional economies infrastructure can stimulate economic growth [7]. However, in the Russian Federation a significant part of interbudgetary transfers is intended to equalize the regions' budget provision and to finance social mandates transferred from the federal center. Therefore, econometric models of different specifications led to contradictory results. According to Martinez-Vazquez and Timofeev [13], interbudgetary transfers and alignment of budgetary provision of Russian regions positively affected the economic growth, while Isaev in his research [6] concluded that this influence was negative.

Some researchers proposed a structural and deterministic factor analysis to explore the revenues of budget system. Thus, in the study of Russian sub-federal budgets [10; 11], the contribution of various sources to fiscal revenues was evaluated at the stages of the budgetary process: collection of taxes, their distribution among the levels of the budgetary system, collection of non-tax revenues, obtaining inter-budgetary assistance and attraction of loans.

At the same time, there are very few studies examining impact of the sectoral structure of economy on budget revenues [8]. Meanwhile, we believe that industries located in the regions basically determine the level of subfederal fiscal revenues and its interregional differences across the country. Regions (provinces, states) within the same country are not so much distinguished by institutional conditions as by their industrial structure. Macroeconomic conditions affect different industries in different ways. Thus, oil prices are more significant for incomes of those regions where the extractive industry is concentrated [5]. Therefore, the sectoral structure of economy does matter for the provision of sub-federal budgets.

Some authors explored the interrelationship of the sectoral structure of regional economies with the parameters of their budget systems. For example, in the study examining the impact of industrial structure of Russian regions' economies on the properties of their tax systems [12], the developed regression models confirmed that economic diversification positively influenced tax systems stability, while specialization of economy was directly

correlated with the overall tax return. Paredes and Rivera in their study [14] concluded that in countries with a higher level of extractive industry, a mineral extraction tax may crowd out other taxes. This implies that tax system in such countries may have a certain bias, which leads to greater differentiation of regions in terms of budget provision. Liu, Hu and Wu [9] examined not only direct, but also inverse effect of fiscal decentralization and financial efficiency on upgrading the regional sectoral structure.

The purpose of this study is to determine the impact of both sectoral structure of regional economics and indicators related to redistributive policy (tax sharing and intergovernmental transfers) on the level of per capita revenues of the consolidated budgets of the subjects of the Russian Federation in 2006-2015.

### 3 Material and Methods

The research is based on official data on 80 Russian regions in 2006-2015 provided by the Federal State Statistic Service and the Federal Tax Service of Russian Federation. A pooled spatial-temporal sample including 800 observations is applied in functional and regression analysis.

One set of the data used is related to budget revenues and their components. It embraces: 1) total tax revenues collected in the regions; 2) total tax revenues of sub-federal consolidated budgets, remaining after tax sharing with the higher level of budget system (further called own tax revenues); 3) total inter-budgetary transfers remitted from the federal budget to sub-federal budgets; 4) total budget revenues including own tax and non-tax revenues and gratuitous transfers, where most part of the latter is presented by interbudgetary transfers to regions from federal center. We also collected and processed data on total tax revenues disaggregated by 14 main economic activities (sectors of economy), according by the All-Russian Classifier of Types of Economic Activity. Unassigned tax revenues and revenues received from individuals, totally accounting for 5% of overall tax revenues, were proportionally distributed among all sectors.

Another set of data concerned the real sector of economy. It included GRP and employment in main economic activities, average annual population in Russian regions. To bring nominal incomes (GRP, tax and budget revenues) in time series to comparable prices we calculated them in real terms using GRP deflator indices also provided by official statistics.

First of all, preliminary attempts to construct econometric dependencies of budgetary, total or own tax revenues on the structural parameters of regional economies, such as the GRP per capita in main economic activities, the share of these sectors in total employment or in GRP, did not yield a positive result. Either these models did not meet the quality criteria (significance of estimates of models parameters, normal distribution of residuals, absence of multicollinearity, heteroscedasticity and autocorrelation of residuals), or important variables were omitted, which impeded meaningful analysis. Therefore, we presented a part of the study related to formation of total tax revenues per capita as a functional dependence, capturing the structural peculiarities of regional economies.

The function of total tax revenues per capita of each  $i$ -th region in each  $j$ -th year ( $T_{ij}/P_{ij}$ ) can be represented as the sum of tax revenues per capita received from all  $k$ -th sectors of economy ( $k = \overrightarrow{1, K}$ ), can be written in the form of a multiplicative model:

$$TRpc_{ij} = T_{ij} / P_{ij} = \sum_{k=1}^K T_{ijk} / P_{ij} = \sum_{k=1}^K \frac{Y_{ijk}}{N_{ijk}} \cdot \frac{N_{ijk}}{N_{ik}} \cdot \frac{T_{ijk}}{Y_{ijk}} \cdot \frac{N_{ik}}{P_{ik}} = \sum_{k=1}^K y_{ijk} \cdot d_{ijk} \cdot t_{ijk} \cdot e_{ij}, \quad (1)$$

where  $y_{ijk}$  - labor productivity of  $k$ -th sector in  $i$ -th region in  $j$ -th year, representing the ratio of the  $k$ -th sectoral GRP ( $Y_{ijk}$ ) to the number of employed persons in this sector ( $N_{ijk}$ );  $d_{ijk}$  - share of employees in  $k$ -th sector of regional economy, calculated as the ratio of the number of

employees in this sector to the total number of employees in all sectors of the region ( $N_{ik}$ );  $t_{ijk}$  - tax return of k-th sector, the ratio of the tax revenues from this sector ( $T_{ijk}$ ) to the sectoral GRP;  $e_{ij}$  - level of employment in the region, the ratio of employed to the average annual population in the region ( $P_{ik}$ ).

This model allows to perform bilateral decomposition of total tax revenues per capita by sectors of economy (sources of income) and by their main determinants: the labor productivity, the sectoral structure of employment, the level of tax return, adjusted for the general level of employment in the region. Further use of the mixed proportional and logarithmic factor analysis enables us to evaluate the contribution of each determinant of each sector to change of total tax revenues per capita in each region over a certain period of time. In case of negative revenues of some industries, the logarithmic method of factor analysis can be replaced by the integral method of it.

The second part of our research included development of regression models, when the revenues of sub-federal consolidated budgets per capita were treated as a dependent variable. A set of independent variables, the total tax revenues per capita, the share of own tax revenues in total tax revenues and the level of inter-budgetary aid (evaluated through the share of transfers in total budget revenues), were tested as exogenous variables presumably affecting the level of budget revenues in regions.

Analysis of the distribution function of the dependent variable in its logarithm form led us to the conclusion about its abnormal appearance and proximity to the Poisson rather than to the Gaussian type. It questioned the adequacy of the ordinary least squares (OLS) method for estimation of regression. For solving this problem, the Poisson regression model of a log-linear type was constructed and estimated using the maximum likelihood method (MLE):  $\ln(Y) = \beta \cdot \ln(X) + \varepsilon$ , where  $E[\varepsilon | X] = 0$ . For function of this type, the coefficients of regression attain the property of efficiency along with other important properties. In this case, there are no specific requirements for the distribution function of the model residuals; the only critically important requirement is the absence of their autocorrelation. The methods described herein were used in our further calculations.

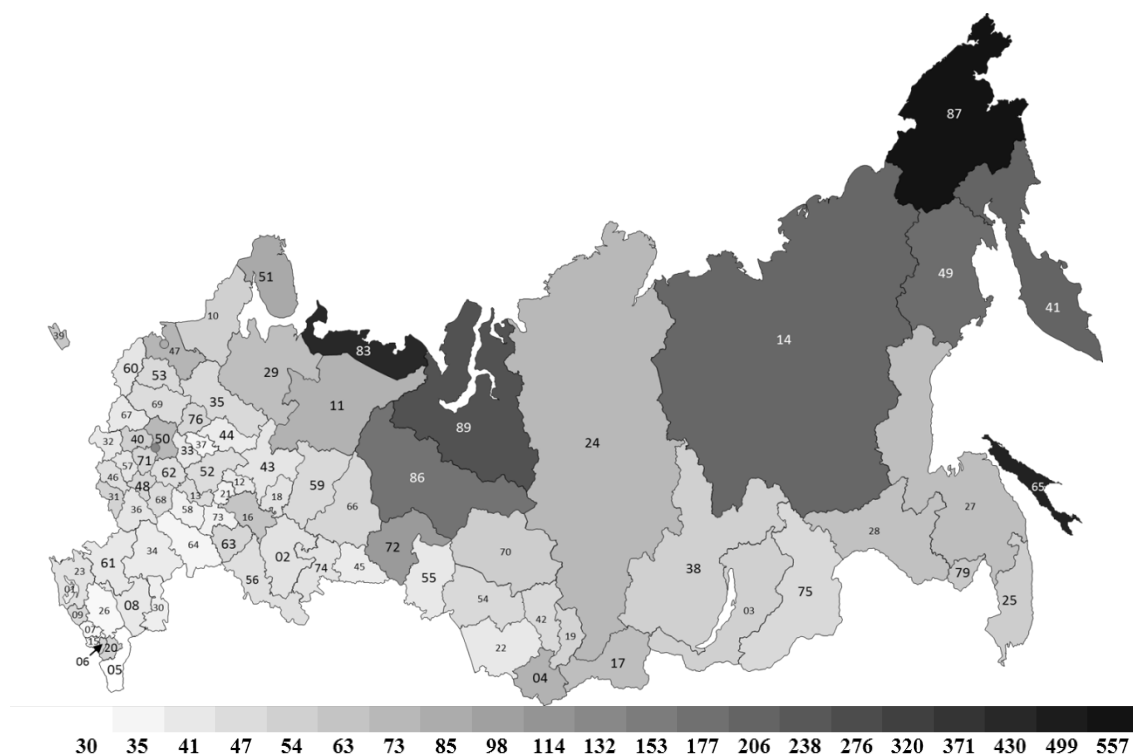
#### 4 Results and Discussion

First of all, Figure 1 demonstrates a high level of dispersion in the budget provision of Russian regions and significant superiority of some rich regions over the rest.

In fact, those Russian regions which are characterised by raw-material orientation of the economy and comparatively low density of population (Chukotka Autonomous Area - No. 87 in the map, Sakhalin Oblast - 65, Kamchatka Krai - 41, Magadan oblast - 41, and Republic of Sakha (Yakutia) - 14, which are the subjects of the Far Eastern Federal District; Nenets - 83, Khanty-Mansi - 86 and Yamal-Nenets - 89 Autonomous Areas - three main mining territories), as well as the subjects of the Russian Federation expanding vast markets and hosting a large number of state institutions and organizations (the City of Moscow), proved to be the leaders in the budget system provision. The subjects of the Russian Federation, deprived of comparative advantages of both natural and artificial origin, in particular Ivanovo Oblast - 37 (which is the subjects of the Central Federal District), Republic of Mari El - 12 and Chuvash Republic - 21 (the subjects of the Volga Federal District), Republic of Dagestan - 05, Kabardino-Balkarian Republic - 07, Republic of North Ossetia – Alania - 15 and Stavropol Krai - 26 (the subjects of the North-Caucasian Federal District) and some other territories appeared among the lagging by budget provision. Most of them are agrarian territories or regions with prevailing light industry in the structure of the economy (the case of Ivanovo Oblast).

Table 1 demonstrates determinants of main economic sectors from standpoint of their participation in formation of tax revenues, according to the formula 1, where average level of employment in country equals 0.426.

**Figure 1. The map of Russian regions' budget revenues per capita, thousand rubles (Source: Authors)**



Notes. The subjects of Russian Federation are designated by administrative codes. We used logarithmic scale to present data

**Table 1. Determinants of tax revenues in economic sectors of Russian regions on average in 2006-2014 (Source: Authors)**

Sectors	Labor productivity, rubles		Share in employment		Tax return		Tax revenue per capita, rubles	
	Mean	CV	Mean	CV	Mean	CV	Mean	CV
Agriculture, hunting and forestry + Fishing, fish farming	308051	0.616	0.099	0.482	0.025	1.759	328	1.744
Mining and quarrying	4371256	1.501	0.016	1.845	0.510	0.835	14780	3.920
Manufacturing	724958	0.623	0.155	0.430	0.190	0.542	9080	0.920
Electricity, gas and water	853182	0.684	0.028	0.428	0.158	0.351	1626	0.782
Construction	532443	0.880	0.081	0.318	0.150	0.422	2745	1.528
Wholesale and retail trade; repair	675420	0.965	0.179	0.224	0.106	0.453	5457	1.376
Accommodation and food service activities	361046	0.587	0.018	0.282	0.117	0.561	331	1.401
Transport and telecommunications	781510	0.548	0.080	0.230	0.144	0.344	3823	1.004
Real estate, leasing services + Financial activities	784052	0.581	0.098	0.352	0.233	0.344	7597	1.610
Public administration and defense	596106	0.379	0.055	0.327	0.099	0.233	1384	1.023
Education	229144	0.404	0.085	0.238	0.119	0.186	990	0.677
Health and social services	364607	0.508	0.068	0.171	0.077	0.147	814	0.627
Provision of other communal, social and personal services	259089	0.591	0.038	0.174	0.183	0.268	761	1.120

Total (weighted by population or GRP of regions)	631629	1.009	1.000	0.000	0.185	0.436	49716	2.201
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Note. CV is non-weighted coefficient of variation, estimated as ratio of variance to mean value

Evidently, the factor of productivity played a crucial role in Mining and quarrying and decisive role in Electricity, gas and water sector. The employment factor had a greater impact on tax revenues in Wholesale and retail trade and Manufacturing activities. The tax return had noticeable effect on tax receipts in extraction industry, but its level was also above the average in Real estate, leasing services and Financial activities.

Table 2 shows results of decomposition of the sectors' contribution to change in total tax revenues per capita on average in Russian regions in the period reviewed. It clearly indicates the unprecedented role of the mining and quarrying sector in formation of tax revenues and especially effect of labor productivity in it. We should also emphasize a high degree of interregional variation of all parameters in this sector. Both share of employment and tax return influenced the sectors' tax yields in different directions. Meanwhile, the total impact of structural changes in employment was slightly positive, when impact of tax return was negative.

**Table 2. Contribution of determinants of the sectors of Russian economy to change in total tax revenues per capita in Russian regions on average in 2006-2015, % (Source: Authors)**

Sectors/Variables	Labor productivity	Tax return	Share in employment	Total
Agriculture, hunting and forestry + Fishing, fish farming	1.28	-0.52	-0.21	0.55
Mining and quarrying	50.95	1.20	4.84	56.99
Manufacturing	14.79	-1.35	-1.47	11.97
Electricity, gas and water	2.86	-0.79	0.11	2.18
Construction	3.95	-2.24	0.26	1.97
Wholesale and retail trade; repair	5.57	0.87	0.47	6.91
Accommodation and food service activities	0.35	0.03	-0.01	0.37
Transport and telecommunications	5.16	-2.04	-0.07	3.05
Real estate, leasing services + Financial activities	8.05	-1.05	1.41	8.41
Public administration and defense	2.95	0.16	0.23	3.34
Education	1.97	0.31	-0.15	2.13
Health and social services	1.62	0.10	-0.03	1.69
Provision of other communal, social and personal services	1.06	-0.30	-0.05	0.71
Share of population employed	-	-	-	-0.27
Total (weighted by population)	100.56	-5.62	5.33	100.00

Further, we tried to construct the dependence of the total budget revenues of Russian regions on the distributive parameters of the budget system, described in the methodological part of the paper. In this case we used deflation to strengthen the stationarity of long time series.

Table 3 summarizes descriptive statistics for the variables examined. Almost all variables demonstrated a high level of heterogeneity in 2006-2015, as evidenced by their coefficients of variation. For instance, the share of transfers in total budget revenues of affluent Sakhalin Oblast did not exceed 25% across time, while in lagging Republic of Ingushetia it reached as much as 90%. The share of own taxes showed a smallest dispersion. Meantime, in the capital city of Moscow this share was circa 60%, whilst in Republic of Khakassia it amounted to 95%.

**Table 3. Descriptive analysis of dependent and factor variables (Source: Authors)**

Variables	Symbol	Mean value	Standard deviation	Coefficient of variation
1. Budget revenues per capita (deflated), thousand rub.	<i>BR<sub>pc</sub></i>	29367	27825	0.95

2. Total revenues per capita (deflated), thousand rub.	<i>TRpc</i>	28195	40093	1.42
3. Share of own tax revenues in total tax revenues	<i>Selftax</i>	0.727	0.191	0.26
4. Share of interbudgetary transfers in total budget revenues	<i>Trans</i>	0.33	0.195	0.58

As we indicated in the introduction, two powerful redistribution channels (tax sharing and interbudgetary transfers) substantially equalized the level of budget provision of Russian regions. However, our analysis revealed two interesting phenomena. Firstly, a significant portion of budget revenues, redistributed through the federal budget in favor of low-income North Caucasus regions and some backward southern border areas, e.g. the republics of Tyva, Kalmykia, Altai, actually raised them to the national average and even higher. Secondly, substantial interbudgetary transfers were also received by the regions of the Far Eastern Federal District (e.g. Chukotka Autonomous District - the leader by budget provision, Magadan Oblast and Kamchatka Krai), where the level of own budget revenues per capita was relatively higher, but the required budgetary expenditures per capita, taking into account financing of social mandates and infrastructure, were even greater.

The next step of our study was construction of regression model based on the pseudo-Poisson distribution of the dependent variable taken in logarithm form.

$$\ln(BR_{pc_{it}}) = 1.649 + 0.074 \cdot \ln(TR_{pc_{it}}) + 0.072 \cdot \ln(Selftax_{it}) + 0.035 \cdot \ln(Trans_{it}) + \varepsilon_{it}, \quad (2)$$

(0.018) (0.004) (0.004) (0.002)

where  $i$  – the number of region,  $t$  – year.

In the developed regression, all independent variables are statistically significant with  $p < 0.01$  and explain 64% of variation of the dependent variable, according to the Pseudo R-squared by McFadden.

At the same time it should be noted that the signs of the coefficients of regressors in some cases turned out to be opposite to the signs of the Pearson correlation coefficients for the corresponding variables. This was due to the fact that other independent variables played the role of control variables in the model, which redefined the cause-effect relationships in it. Indeed, the level of budget provision appeared to be positively related to the level of both collected taxes and taxes remaining in the regions consolidated budgets and to the level of intergovernmental aid, which is completely consistent with the logic of additive process. Finally, coefficients of variables can be interpreted as indicators of elasticity. For example, an increase in the total tax revenues per capita by 1% provided an increase in the budget revenues of Russian regions by 0.074% on average, while the same changes in transfers ensured only 0.035% of additional income.

## 5 Conclusion

The research is dedicated to the analysis of factors influencing sub-federal budget revenues and based on the cross-sectional data of the Russian regions in 2006-2015. We found out that researchers attach greater importance to the impact of macroeconomic conditions, institutional features of tax and budgetary systems and public behavior on the level of average budget revenues of states and their constituent entities. However, there is an apparent shortage of studies related to influence of sectoral structure of economy on tax and budget revenues of regional economies. We proposed a new additive-multiplicative model of formation of total tax revenues in regions, represented as the sum of products of labor productivity, share of employment and level of tax return in 14 sectors of economy, adjusted for total level of employment in regions. Its decomposition using mixed proportional-logarithm-integral factor analysis proved that more than half of increase in total tax revenues in Russian regions over 10 years was contributed by growth of productivity in mining and quarrying sector. To identify influence of redistributive factors of budget system on the level of sub-federal budget provision, we developed a regression dependency of budget revenues per capita on the collected taxes per

capita, the share of own tax revenues remaining at the regional level and the share of interbudgetary transfers in total budget income. The regression was estimated by means of the maximum likelihood method. The obtained coefficients of elasticity indicated that collected taxes and tax sharing system influenced the differences in sub-federal budgets provision to greater extent than interbudgetary transfers. The research outcome is basically consistent with some of our previous findings establishing impact of sectoral structure of economy and its diversity on the risk component of sub-federal budgets [12]. Further extension of this analysis is expected in integration of structural and redistribution models with a view to improve the technology of both deterministic and regression factor analysis.

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# Should we Support Only Poor Children? Selected Trends in Czech Family Policy 1993-2017

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## Abstract

Children's benefits are the important element of family policy. They can be provided basically in two main ways – through income tax credit or through direct transfers such as children allowances. It also matters to what extent family benefits are means-tested. These mechanisms affect both the degree of redistribution and the families' income situation according to their structure and character. In addition, we can trace the logic of welfare state models in the practice of individual countries. There is no single best model of family benefits that prevails everywhere; therefore, we must analyze different policy options that are available. The paper unveils the situation that has been gradually emerging in Czech family policy based on the empirical settings of the tax and benefit system. It shows the situation of three model families based on calculations and data from period 1993-2017 and the gap they have to receive direct benefit support. The result is the basic assessment of selected trends in family policy in Czechia.

*Keywords: family policy; taxation; family allowances; welfare state; social policy*

JEL Classification: H24, H55, H53

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## 1 Introduction

Family policy is an important sector of social policy and support for families has both fiscal and general economic importance. Since the beginning of Czech economic transformation, it has undergone several stages of development, one of the trends being more targeted support and strengthening of the link to the economic activity of parents. This resulted into introduction of a combination of a child tax credit and tax bonus with fairly debatable targeting [8], [15], [7].

There are several basic models of family policy [11] that have a distinct logic, and we can find their elements in the social systems of individual countries [9] and public choice approaches [10]. The first is a social democratic (universalistic) model that supports every child regardless of the social status of parents or the whole family, preferring untested, universal family benefits and public financing of family services [1]. The second is a conservative model that derives family support from work performance and merit combined with whole family income testing and taxation. The third basic model is a liberal model that only supports children from very poor families on the principle of social need and accentuates the citizen's responsibility for the fate of their family. This original liberal model has evolved during 20<sup>th</sup> century into Beveridge's low universal children benefits and neoliberal variants which push income tax credits for lower-income families only [15]. The actual implementation is usually a combination of elements, for classification matters most which system components are dominant in each country [11], [4]. The level of support varies from country to country [13], but it is generally acknowledged that transfers to families with children make sense [2] without necessarily weakening the parents' natural motivation to care for children and to secure their families – it is support, not substitution of their role [6].

An important issue of family benefits is how and by what criteria they are provided. Currently in Czechia, it is the use of a tax bonus along with supplemental strictly means-tested child allowances [5], with tax credits in the background as indirect support for higher income families [7].

The aim of this paper is to map the trends in the area of child allowances, tax credits and living minimum of three model families with average income in Czechia. Based on this, to show how the changes in the middle of the last decade have limited several elements, such as the

differentiation of family benefits by the age of the child or direct support for families with children.

## 2 Material and Methods

Theoretically, this paper is well anchored in the methodology of social policy [14]. Three model families were chosen, where the breadwinner (employee) always has an average income and the family configuration is as:

- Single breadwinner, 1 child (8 years) – model 1
- Breadwinner, 2<sup>nd</sup> parent caring for children, 2 children (2 and 7 years) – model 2
- 2 breadwinners, 2 children (14 and 18 years) – model 3

We analyze the construction and the legislative adjustment of support for families in the period 1993-2017, based on the valid legislation and statistics of the Czech statistical office (CZSO). We create a child allowance and a tax bonus calculation for model households with average income according to CZSO statistics. According to the valid tax rules, the net income is calculated, and a gap is then identified that exists for the household to be entitled for direct child benefit support – child allowance, child tax bonus.

Due to the highly limited scope of the contribution, we focused on showing significant trends over a long period (1993-2017). For family 3, the published tables are reduced in five-year (Table 5) and two-year (Table 6) intervals, and the authors have complete calculations available. This is a partial output of more extensive research, and we know that the issue has further fiscal, redistributive and conceptual contexts to be considered in our follow-up publications.

## 3 Results and Discussion

In our calculation, we considered that the CZSO has been monitoring only the amount of gross average wages in its structural survey of employees' wages, so there was necessary to adjust the gross wages by health and social insurance payments and income tax according to the valid legislation throughout the monitored period.

Every employee is entitled to apply tax relief for the taxpayer every month. In the years 1993-2005 it was deductible item from the tax base, in 2006-2017 a tax credit. After this adjustment, it is necessary to set the amount of the income tax advance and deduct from the gross wage. Between 1993 and 2007, progressive taxation was based on tax brackets and the applicable tax rates. Since 2008, this progressive tax has been abolished and tax advances are counted as 15% of the super-gross wage (1.34 times the gross wage).

In table 1, the Monthly net income of the family is adjusted for this income by monthly tax relief per child. Between 1993 and 2004, it was once again a deductible item from the tax base, from 2005 to the present it is a tax credit on previously calculated income tax. Due to the ability to provide information and the ability to evaluate this item throughout the analyzed period, the deductions in 1993-2004 must have been recalculated to the tax credit. An advance on the income tax has been calculated before and after applying the deductible item and this difference then constitutes the amount corresponding to the tax credit.

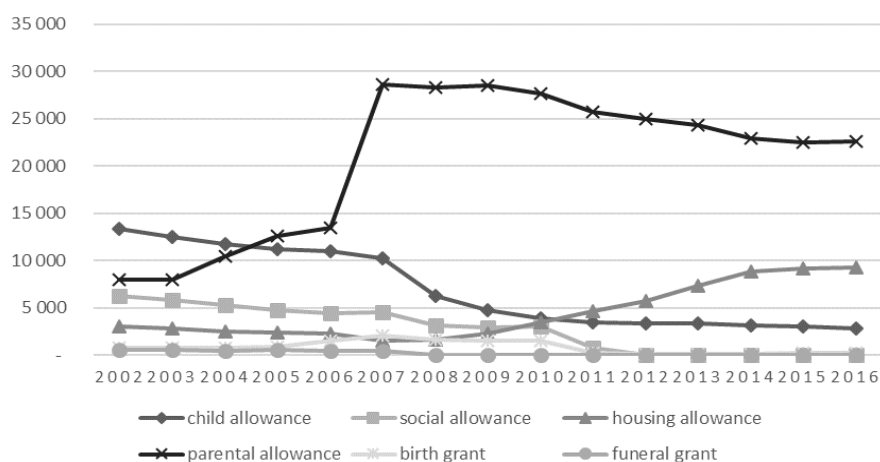
**Table 1. Model 1 – Single breadwinner, 1 child (8 years). (Source: Authors)**

Year	Monthly Tax credit	Monthly net work income	Family living minimum	Income limit for child allowance	Child allowance 8 yrs	Monthly net total income
1993	112	3 843	3270	-	380	4 223
1994	135	4 538	3600	-	380	4 918
1995	150	5 353	4040	-	380	5 733
1996	165	7 518	4390	7 902	409	7 927
1997	180	8 519	4990	8 982	437	8 956
1998	225	8 831	5560	10 008	459	9 290

1999	270	9 464	5560	10 008	484	9 948
2000	270	10 101	6030	10 854	498	10 599
2001	294	10 995	6530	11 754	529	11 524
2002	294	10 984	6530	11 754	529	11 513
2003	334	11 792	6530	19 590	265	12 057
2004	394	12 418	6530	19 590	265	12 683
2005	500	13 083	6810	20 430	269	13 352
2006	500	14 065	6980	20 940	273	14 338
2007	500	14 780	4840	19 360	314	15 094
2008	890	15 984	4840	11 616	0	15 984
2009	890	16 589	4840	11 616	0	16 589
2010	967	16 434	4840	11 616	0	16 434
2011	967	16 522	4840	11 616	0	16 522
2012	1 117	16 989	5280	12 672	0	16 989
2013	1 117	17 147	5280	12 672	0	17 147
2014	1 117	17 419	5280	12 672	0	17 419
2015	1 117	17 967	5280	12 672	0	17 967
2016	1 117	18 731	5280	12 672	0	18 731
2017	1 117	19 205	5280	12 672	0	19 205

The living minimum for the family was calculated according to the valid legislation. In the years 1993-2006, this was the sum: adult + child in the 6-10 age category + common needs of a two-member household. Thereafter, this construction was canceled and, since 2007, it has been the sum of the first adult + child in the 6-10 year category, which reduced the total living level for this family considerably. It should partly compensate for the housing allowance, which, however, is not primarily the support of the family, but the landlord (the owner) of the property. This benefit is often abused (along with housing supplement), and fiscal costs have increased significantly from CZK 1.5 billion in 2007 to CZK 9.2 billion in 2016, as shown in the graph below.

**Figure 1. Expenditure on state social support, 2002-2016, thousands CZK. (Source: [3])**



In 1993-1995, child allowance was not tested for income, so it was provided universally. It was only in 1996 that the entitlement to child benefit was assessed according to the maximum income threshold, the construction of which is based on the living minimum for the family, in 1996-2007 in three levels - basic, reduced or increased, from 2008-2017 only in the base level, times the relevant coefficient. Based on a comparison of the maximum income and net wage of the single parent, this family was entitled to a child allowance in the base year 1996-2002 in the basic level, only in a reduced level in 2003-2007. Table 1 shows that since 2008, the family in this model is not entitled to child allowances, even if it is a single breadwinner with an average wage.

In table 2 there is intentionally chosen the period 2008-2017, when this family is not entitled according to the valid legislation for the child allowance, which is assessed from the living minimum level by a coefficient of 2.4, which is the maximum income limit for this entitlement. Since 1.1.2018, the 2.7 coefficient is in force, but in our model 1 it does not make any difference. The amount of the coefficient would have to be increased to 3.7 where the

maximum limit of decisive income in 2008-2011 would be 17 908 CZK, in the period 2012-2017 19 536 CZK. In the case of this increase in the coefficient, this family will be entitled to the allowance.

**Table 2. Model 1: Gap between family's income and child allowance/child tax bonus (Source: Authors)**

Year	Monthly net total income	Lowering income for child allowance	Lowering in %	Child allowance 8 yrs	Lowering income for tax bonus	Lowering in %	Tax bonus return
2008	15 984	4 368	27	630	3 476	22	84
2009	16 589	4 973	31	660	3 783	23	80
2010	16 434	4 818	30	610	3 315	20	82
2011	16 522	4 906	31	610	3 842	23	87
2012	16 989	4 317	27	610	3 201	19	82
2013	17 147	4 475	28	610	3 359	20	82
2014	17 419	4 747	30	610	3 631	21	82
2015	17 967	5 295	33	610	4 179	23	82
2016	18 731	6 059	38	610	4 943	26	82
2017	19 205	6 533	41	610	5 417	28	82

While the usual taxpayer's tax credit can be deducted only up to the amount of the calculated tax liability (is non-refundable), the so-called child tax bonus introduced in 2005 can be used for direct family support (is refundable). If the taxpayer, after deduction of this credit, gets into the minus, e.g. the sum of tax credit is higher than the originally calculated tax liability, the difference will be the tax bonus which is returned to the taxpayer. This is a form of negative income tax for families with children. However only those, who have an annual income higher than six times the minimum wage, are entitled to this tax bonus. Therefore, tax bonus is not applicable for long-term unemployed, invalidity or old-age pensioners or citizens with no or low taxable income. In model 1, single-person income is higher, i.e., throughout the period under review, her tax advance does not reach negative values, so she must pay income tax advances and there is no entitlement to the child tax bonus.

The income of the single parent would have to fall by CZK 4 368 – 6 533 in this period, so this reduction in income would have to be 27-41% in order to qualify for the child allowance. This explains how the calculation of the entitlement to child allowance is poorly set, even if single parent with average wage is not eligible for it. In the case of a tax bonus, the net income of the single parent would have to decrease the most in all models, by 3 476 – 5 417 CZK, in percentage terms of 19-28%.

In Table 3, in the column Monthly net work income, the construction of the calculation of net wage as in the previous model 1 is the same, except that there are credits for two children aged 2 and 7 years. From 2015, the child tax credit has been adjusted according to the order of the child. However, this arrangement does not take into account the age of the child as opposed to the construction of the child allowance.

**Table 3. Breadwinner, 2nd parent caring for children, 2 children (2 and 7 years). (Source: Authors)**

Year	Monthly tax credits		Monthly net work income	Parent al allowance	Monthl y net income	Family living minimum	Income limit for child allowance	Child allowances		Monthl y net total income
	2 yrs	7 yrs						2 yrs	7 yrs	
1993	113	113	4 807	1 360	6 167	5 830	-	340	380	6 887
1994	135	135	5 701	1 500	7 201	6 420	-	340	380	7 921
1995	158	158	6 773	1 848	8 621	7 190	-	340	380	9 341
1996	205	205	9 754	1 980	11 734	7 780	14 004	370	409	12 513
1997	240	240	11 226	2 112	13 338	8 810	15 858	395	437	14 170
1998	300	300	12 227	2 222	14 449	9 660	17 388	414	459	15 322
1999	338	338	12 955	2 343	15 298	9 660	17 388	437	484	16 219
2000	360	360	13 800	2 343	16 143	10 320	18 576	448	498	17 089
2001	392	392	14 790	2 409	17 199	11 100	19 980	473	529	18 201
2002	359	359	13 654	2 552	16 206	11 100	19 980	473	529	17 208
2003	387	387	14 611	2 552	17 163	11 100	19 980	473	529	18 165
2004	426	426	15 460	3 573	19 033	11 100	19 980	473	529	20 035

2005	500	500	16 267	3 634	19 901	11 500	20 700	482	538	20 921
2006	500	500	17 286	3 696	20 982	11 760	21 168	490	546	22 018
2007	500	500	18 393	7 582	25 975	9 040	36 160	256	314	26 545
2008	890	890	20 265	7 600	27 865	9 040	21 696	0	0	27 865
2009	890	890	20 489	7 600	28 089	9 040	21 696	0	0	28 089
2010	967	967	19 891	7 600	27 491	9 040	21 696	0	0	27 491
2011	967	967	20 108	7 600	27 708	9 040	21 696	0	0	27 708
2012	1 117	1 117	20 598	7 600	28 198	9 850	23 640	0	0	28 198
2013	1 117	1 117	20 808	7 600	28 408	9 850	23 640	0	0	28 408
2014	1 117	1 117	21 294	7 600	28 894	9 850	23 640	0	0	28 894
2015	1 117	1 317	22 191	7 600	29 791	9 850	23 640	0	0	29 791
2016	1 117	1 417	23 180	7 600	30 780	9 850	23 640	0	0	30 780
2017	1 117	1 617	24 004	7 600	31 604	9 850	23 640	0	0	31 604

In 1993-2006, the parental allowance was paid in a single amount for all recipients of the benefit. In 2007, the method of determining this amount of benefit was changed, and it was newly derived from the average wage in the non-business sphere according to the CZSO in 2005. Since 2008, the option has been introduced in three levels. Increased when faster drawdown, i.e. CZK 11 400 per month up to two years of child's age. Basic – 7 600 CZK up to three years of child's age. And lower when slower drawdown, i.e. 7 600 CZK per month up to 21 months of age and up to 4 years CZK 3 800. In our model, a basic draw has been selected.

The living minimum for a family in 1993-2006 is the sum of 2 adults + a child under the age of 6 + a child in the 6-10 age category + the common needs of a four-member household. Since 2007, it is the sum of the first and the second adult + a child in the category up to 6 years + a child in the 6-10 years category, which of course also significantly reduced the total sum of the living minimum for this family.

In the case of entitlement to child allowance, the same calculation was used as for Model 1. Again, based on a comparison of the maximum income threshold and the net income of this family, this family was entitled to a child allowance in the base year 1996-2006, 2007 only in a reduced level. Since 2008, this family is not entitled to a child allowance.

As in the previous model, here too, by increasing the coefficient to 2.7 this family is not entitled to child allowance. The amount of the coefficient would have to be increased to 3.3, where the maximum limit of the decisive income would be CZK 29 832 in the years 2008-2011, and in the period 2012-2017 CZK 32 505. In the case of this increase in the coefficient, this family will be entitled to the allowance.

**Table 4. Model 2: Gap between family's income and child allowance/child tax bonus. (Source: Authors)**

Year	Monthly net total income	Lowering income for child allowance	Lowering in %	Child allowances		Lowering income for tax bonus	Lowering in %	Tax bonus return
				2 yrs	7 yrs			
2008	27 865	6 169	22	500	630	3 876	19	73
2009	28 089	6 393	23	550	660	3 215	16	80
2010	27 491	5 795	21	500	610	2 463	12	74
2011	27 708	6 012	22	500	610	3 119	16	79
2012	28 198	4 558	16	500	610	1 834	9	74
2013	28 408	4 768	17	500	610	2 044	10	74
2014	28 894	5 254	19	500	610	2 530	12	74
2015	29 791	6 151	22	500	610	2 532	11	79
2016	30 780	7 140	26	500	610	3 082	13	74
2017	31 604	7 964	29	500	610	3 010	13	79

The monthly net income of this family would have to fall by CZK 4 558 – 7 964 in this period, this reduction in income would have to be 16-29% in order to qualify for a child allowance. This fact shows how the calculation of the child benefit entitlement is poorly adjusted, not only in relation to drawing child benefit, but the single parent in the previous model 1 would have to have a lower income by 27-41%, i.e. much more than in this model 2. In the case of a tax bonus, the net income of the family would have to decrease by CZK 1 834 – 3 876, in percentage terms by 9-19%.

**Table 5. Model 3: 2 breadwinners, 2 children (14 and 18 years). (Source: Authors)**

Year	Monthly tax credits		Monthly net work income	Monthly income 2 <sup>nd</sup> bread winner	Monthly net household income	Family living minimum	Income limit for child allowance	Child allowances		Monthly net total income
	14 yrs	18 yrs						14 yrs	18 yrs	
1995	158	158	6 773	5 203	11 976	8 000	-	450	490	12 916
2000	360	360	13 800	9 831	23 631	11 360	34 080	295	323	24 249
2005	500	500	16 267	12 583	28 850	12 620	37 860	318	354	29 522
2010	967	967	19 891	15 467	35 358	9 690	23 256	0	0	35 358
2015	1 117	1 317	22 191	16 850	39 041	10 560	25 344	0	0	39 041
2016	1 117	1 417	23 180	17 614	40 794	10 560	25 344	0	0	40 794
2017	1 117	1 617	24 004	18 088	42 092	10 560	25 344	0	0	42 092

In Table 5, the Monthly net work income column has the same construction of the net wage calculation as in the previous model 2, except that there are credits for two children aged 14 and 18 and two breadwinners.

The living minimum for a family in 1993-2006 is the sum of 2 adults + a child in the 10-15 years age category + a child in the 15-26 age group + the common needs of a four-member household. Since 2007, it is the sum of the first and the second adult + a child in the 10-15 years category + a child in the 15-26 age category, which of course also significantly reduced the total living minimum level for this family.

In the case of entitlement to child allowance, the same calculation was used as for model 1. Again, based on a comparison of the maximum income threshold and the net income of this family, this family was entitled to a child allowance in 1996-2006 only in a reduced level. Since 2008, this family is not entitled to a child allowance at all.

As in the previous model, here too, by increasing the coefficient to 2.7 this family is not entitled to child allowance. The amount of the coefficient would have to be increased to 4.0 when the maximum limit of decisive income would be CZK 38 760 in the years 2008-2011, and in the period 2012-2017 CZK 42 240. In the case of this increase in the coefficient, this family will be entitled to the allowance.

**Table 6. Model 3: Gap between family's income and child allowance/child tax bonus. (Source: Authors)**

Year	Monthly net total income	Lowering income for child allowance	Lowering in %	Child allowances		Lowering income for tax bonus	Lowering in %	Tax bonus return
				14 yrs	18 yrs			
2009	36 188	12 932	36	660	750	3 215	16	80
2011	35 663	12 407	35	610	700	3 119	16	79
2013	36 838	11 494	31	610	700	2 044	10	74
2015	39 041	13 697	35	610	700	2 532	11	79
2017	42 092	16 748	40	610	700	3 010	13	79

The monthly net income of this family would have to decrease by 11 126 – 16 748 CZK (numbers taken from calculation of all years 2008-2017), i.e. this reduction in income would have to be 31-40% to qualify for a child allowance. In the case of a tax bonus, net family income would have to fall by 1 834 – 3 876 CZK, in a percentage of 9-19%.

Obviously, since the middle of the last decade, family support has been transformed into a tax credit/bonus system in line with the conservative social model, and child allowance has begun to play a residual role according to strictly means-tested model. Together with the low living minimum level, the importance of the child allowance has significantly diminished (also fiscally as shown on Figure 1), but the tax bonus is not entirely proportional to its role because it is conditioned by economic activity, it is not differentiated according to the age of the child (child allowance) and it is not designed for the poor, socially disadvantaged families.

An important question is whether it is desirable to bind support for children with their parents' economic activity. This is the main attribute of a tax bonus, the payment of which is conditional on reaching an annual income higher than six times the minimum wage. It is clear that in the case of long-term unemployed (e.g. more than 1 year) or families with social pathology, the potential abuse of direct family support may be treated differently - e.g. by

checking the family accounts for actual expenditure for the benefit of children. In other social groups the risk of direct support misuse is minimal [6], [12], [1].

In addition, the calculations showed that families with average earnings do not get this bonus and thus are supported only indirectly through tax credit. In 2017, they have a higher income of 13-28 percent than they need to switch to receive at least part of support directly as a bonus. The analysis shows that the current combination of strictly tested child allowances, tax credit and tax bonus is a sign of efforts to introduce conservative model elements and increase the motivation to work. As a result, direct support for families in typical households with average income is not achieved, children of parents that do not have enough taxable income (if they are not really poor) do not receive support and the construction of benefits does not take into account real spending related to the children's age.

#### **4 Conclusion**

We have identified several important trends in Czech family policy. In 2005, child tax credits were introduced to replace deductible items from the tax base. For economically active breadwinners who have stable and high enough income (tax base), this indirect support works well. However, parents' economic activity with taxable income is required, which is debatable. The occurrence of a social event with a more significant loss of earnings (longer unemployment, illness, disability) can lead to a reduction or loss of entitlement to support. While we can agree with the incentive function of conservative scheme, the question is whether the motivation to work should be pursued through family policy, or whether, on the contrary, it should be sufficient to use standard minimum income variables and employment policy instruments. For the family policy effectiveness, we see as most essential if the parent (breadwinner) can administrate received benefits for the welfare of the child appropriately. If he works and earns enough is secondary and that needn't be a condition for support of his children.

Since 2007 there has been a change in the structure of living minimum and child allowance. By introducing a strict income test at the level of 2.4 times the living minimum and by changing the living minimum structure, there has been a significant reduction in child allowances. At the same time, support within tax system has been expanded, but it is done based on a conservative (performance-based) model of social policy. Previously, the child allowance was differentiated according to the household income level at three levels (reduced, basic and increased), whereas after the introduction of one low coefficient, there was no real room for such differentiation. Some change occurred only from 2015 onwards by differentiating the tax credit according to the order of the child, but not according to its age, as is the case with child allowances. Because of these measures, direct family support is currently targeted mainly on low-income households in Czechia and e.g. our model families with average work income do not reach the child allowances or child tax bonus at all.

It has been identified that the gap increases in times of economic growth (2014-2017) especially with the child benefit allowance. In addition, the living minimum, which is 2.4 times the limit for granting the allowance, has not been significantly changed in recent years. As of January 1, 2018, the government regulation increases the coefficient to 2.7 and allows again to pay an increased level (for economically active breadwinners); on the other hand it does not change the construction of the living minimum, and it is inefficient from the point of view of our model households with the average income of the breadwinners, as in the analyzed cases it is necessary to increase the coefficient to 3.3-4.0 in order to qualify for direct support.

The question of the living minimum level has wider impacts because it is linked to other minimum income variables and valorization schemes of the living minimum may also be a topic for social policy research. But it seems more advantageous to modify the multiplier of the living minimum for child allowances to support families with children compared to childless families.

Based on the analysis carried out, it is also possible to suggest the change in family policy in the sense of repealing the child tax bonus and changing the threshold for the payment of the child allowance to 4.0 times the living minimum of the household. Or, if desired by public choice

and fiscally feasible, even provide the child allowance universally, keeping the differentiation according to child age and non-refundable child tax credits in place, with future research of fine-tuning of the borders between direct child allowances and indirect tax credits. Accompanying measures to prevent social pathologies are possible, however, for most families, the risk of abuse is relatively low. Such a change would support every child independently of the parents' social status. It is administratively simpler and reduces the incidence of wedges and breaks we have identified in this paper, which depend on the development of the economy and the decisions of public choice, which have been rarely consistent throughout years and political cycle.

## Acknowledgements

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# Viability of Fiscal and Monetary Stabilization Policies - Interrelations of the Structure of Government Deficits, Public Debt and Financial Instability: A Preliminary Analysis of the Czech Republic

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## Abstract

Using Hyman Minsky's theoretical framework of the financial instability hypothesis (FIH), mainly the notion of margins of safety, and to a lesser degree Irving Fisher's debt-deflation theory (DDT), we shall reason that in face of a significant drop in the aggregate output, the fiscal policy might not be able to "reflate" households' and entrepreneurs' profits creating a possible feedback loop to a financial sector that in turn might limit the government's ability of deficit financing via the indirect debt monetization unless a central bank resort to another "whatever-it-takes" policy. More so, we shall try to illustrate that a "Catch-22" situation may develop in connection to regulation imposed by a central bank on financial intermediaries as well as the implications stemming from our proposed dynamics.

*Keywords: financial instability; government deficit; public debt*

JEL Classification: E32, E42, H30, H63

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## 1 Introduction

In the past few years a specific problematic has resurfaced, namely the effectiveness of the monetary and the fiscal policies in counterpoising destructive effects of business cycles. In the presented paper we shall argue that due to the pro-cyclical development of contemporary budget policies and continual accumulation of (public) debt, the effectiveness or mere viability of fiscal stabilization policies might be limited severely if the structure of government budget itself is taken into account.

Using statistical data of the Czech Republic, we shall argue that, owing to severe pro-cyclical tendencies in the budgetary policy as well as to the contemporary structure of deficits themselves and the structure of the private debt, the viability of fiscal stabilization policies might be limited to a high degree in face of a downturn in aggregate output, i.e. most importantly the stability of the aggregate wage bill. As the margins of safety may not be quantified directly, nevertheless we shall try to illustrate indirectly that households' margins of safety may be considered dangerously low, whereas entrepreneurs' ones manage their (debt) positions much more conservatively. On the fiscal part, our work may mainly be considered as a sort of "extension" of [4] and to somewhat a lesser degree of [11, 12, 13], [5] and of an excellent comparative study by [10]. Studies conducted by [15], [21] and [6] are focusing on "the monetary sphere."

## 2 Theoretical Background

FIH is built around a theorem that is sometimes referred to as the "*paradox of tranquillity*" [14] which states that stability breeds instability. In Minsky's own summary of his theory – (i) "*the economy has financing regimes under which it is stable, and financing regimes in which it is unstable*"; (ii) "*over periods of prolonged prosperity, the economy transits from financial relations that make for a stable system to financial relations that make for an unstable system.*" [19]. Highly simplified for our current purposes, FIH utilizes two main features – (i) topology of (financial) units participating in (financial) transactions, and (ii) the notion of margins of safety. Broadly speaking, individual units are distinguished according to their resilience to (unanticipated)

changes in rates of interest. Margins of safety are the other side of the same coin as the topological system of units in their defining whether an economic agent may be deemed to have a characteristic of the hedged (the most stable), the speculative or the ultra – speculative, Ponzi unit (the most unstable). Namely, “*the margins of safety that Keynes referred to exist in an excess of cash receipts over cash payment commitments, the excess of the value of assets over liabilities and holdings of cash are liquid assets.*” [17]. Whether or not an economic system may be close to a crisis depends on a governing type of financing regime; “*if hedged financing dominates then the economy may well be an equilibrium seeking and containing system and the greater the weight of speculative and Ponzi finance the greater the likelihood that the economy is a deviation amplifying system.*” [19].

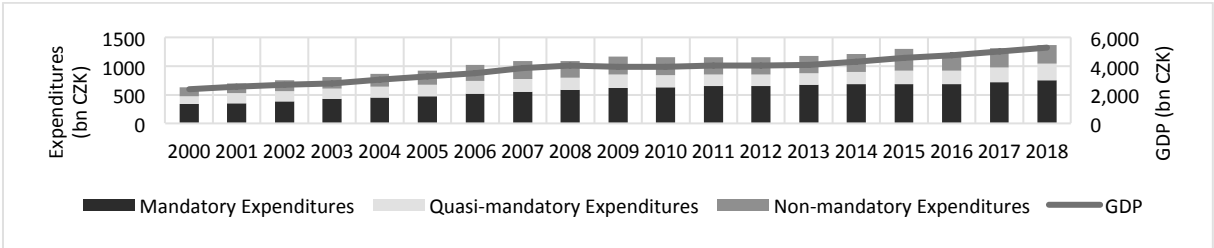
Fisher’s DDT identifies two main tendencies that are most destructive ones – over-indebtedness of economic agents and falling price level of consumers’ products. The explanation itself revolves around the principle of “*the vicious cycle*”, which states that “*the more the debtors pay, the more they owe ... [by] ... the very effort of individuals to lessen their burden of debts increases it, because of the mass effect of the stampede to liquidate in swelling each dollar owed.*” [7, 8] In other words, the more debtors try to pay off their debts, the more they will force prices to fall, thus decreasing overall price level, which increases their burden of accumulated debt in real terms. Highly simplified for our present purposes, it suffices to state that DDT dynamics starts where Minsky’s theory ends, i.e. a state in which agents are not able to meet their commitments on payments due; either because of an unanticipated rise in rates of interest (harder refinancing terms in general) or a drop in expected cash-flow, i.e. an increase in unemployment.

**3 Interrelations of the Structure of Government Deficits, Public Debt and Disposable Income**

Keeping the notion of margins of safety in mind, it is precisely households’ and non-financial institutions’ structure of “balance sheet” and of flow of expected cash-flow that will determine the relative resilience if an economic downturn has started, especially in case of small-open economics such as the Czech Republic. The following statistics is obtained from the Database of National Accounts published by the Czech Statistical Office. At this point we ought to stress that our preliminary analysis focuses primarily on the aspects that may offset deflationary tendencies in over-indebted economy including the most important sectors, i.e. the point of view of availability of disposable funds that may be used to cover payments due whatever their origin may be.

Figures 1 and 2 depict de facto fiscal policy’s “room-to-manoeuvre” as far as the ability to enact discretionary fiscal stabilization policies without resorting to indirect debt monetization is concerned. It is evident that the “room” is limited to an extreme degree as the structure of budget expenditures are mainly of a (quasi)mandatory nature reaching on average almost 75% of all budget expenditures. Similarly, the proportions of the (quasi)mandatory expenses on the total budget tax revenues are even of a higher level reaching 90% on average.

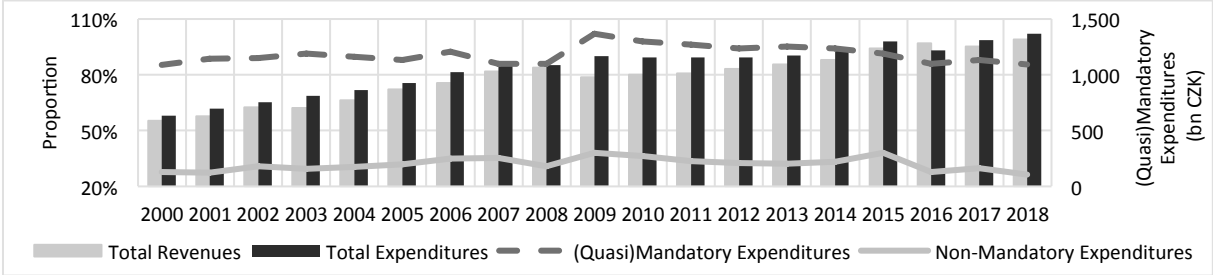
**Figure 1. Structure of Budget Expenditures (Source: Authors based on [2] and [9])**



The interpretation of two structures are somewhat different in their significance. Whereas the former draws a “picture” of possible alteration in the structure of budget in face of an

economic downturn, the latter may be interpreted as sort of a crude approximation of solidity of government’s expected cash-flow from “normal business operations”. Not only will alterations in the structure of budget expenditures be impossible to enforce as these have already been incorporated in public’s expected cash-flow and any decrease will only result in worsening private agents’ economic situation but the extreme ratio of (quasi)mandatory expenditures on tax revenues means that even slight drop in aggregate economic performance will be reflected in a worsening debt position of the government, i.e. in this regard the position of the government as the body that controls fiscal policies is that of at least speculative unit if not even ultra-speculative one.

**Figure 2. The Proportion of the (Quasi)/(Non)Mandatory Expenditures on the Total Budget Revenues (Source: Authors based on [9])**



The figure 3 tracks the evolution of government/state debt and it has been increasing steadily the entire time period, though in the absolute terms it has been stabilized somewhat and it has decreased in relative terms in last few years due to positive aggregate economic activity, however an evaluation both in absolute as well as in relative terms may be misleading in terms of possible (in)stability or resilience against debt-deflationary development, for it omits how and where funds that had been generated by an increased “amount” of debt were allocated. As it has been argued above, the structure is of such an arrangement that it consists mainly of (quasi)mandatory expenditures, i.e. government transfers to the public, meaning it has not been utilized, by a significant part, in increasing the economy’s capacity to cover debt but quite the contrary it may induce private agents’ to increase their overall (financial) liabilities even further. There may be an additional problem connected both to the government (public) as well as the private aggregate debt in the following case. As the private/public debt increases and at the same time the funds generated by these increases have not been used in increasing “the potential output”, and once the debt has reached a significant part of GDP, a mere stabilization of debt to GDP ratio may not be enough to avert a recession after, for example, there has been a significant negative shock to foreign demand for small economy’s domestic products.

**Figure 3. The Evolution of Government/State Debt (Source: Authors based on [3] and [16])**

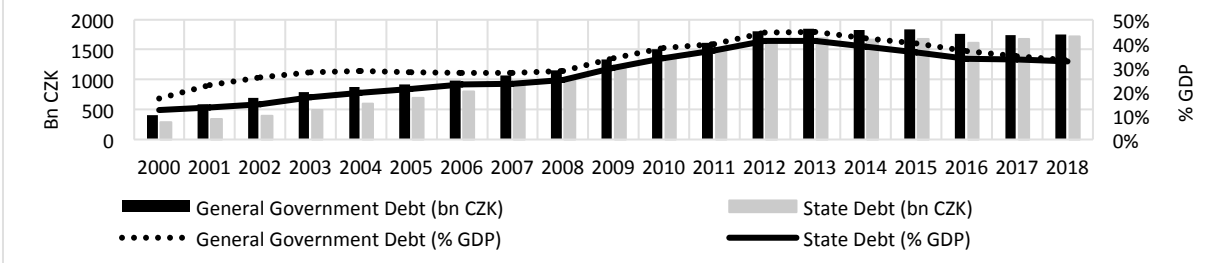
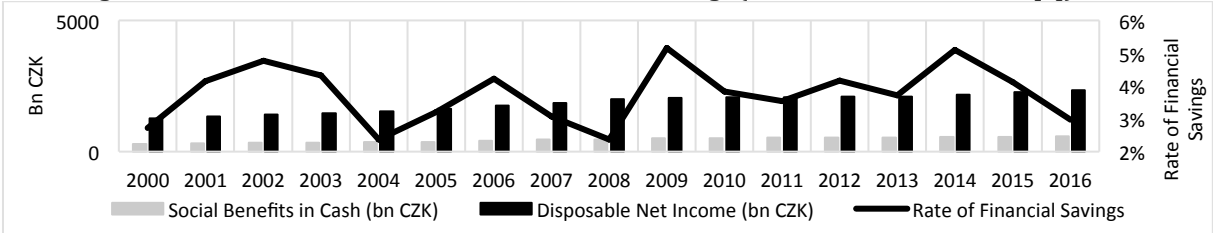


Figure 4 contains statistics for the sector of households’, which shows the development of net disposable income as well as the part of social benefits that are paid in cash and enters the disposable income as whole. The important point is that on average the social benefits paid in cash make up almost 25% of whole income meaning that social benefits are an important part of total income and that it would be unthinkable for a fiscal policy to cut social benefits, even more so if we take into account the rate of financial savings, formally the ratio of net lending to net

disposable income, which may be utilized as an approximation of households' savings that are held in liquid assets, i.e. cash and deposits. It also shows that on an aggregate level household margins of safety in cash are fairly low. In other words, it may be viewed as an analogy to fiscal policy's "room-to-manoeuvre" but in the latter case it tells us the available amount of funds for contingencies, e.g. precautionary money balances in terms of money demand.

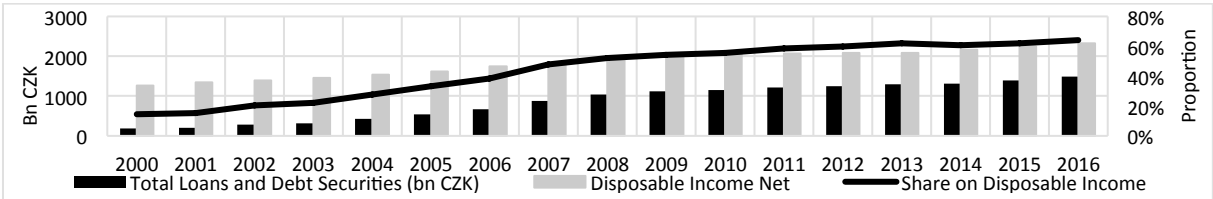
That the situation of households may be the harbinger of future problems may be illustrated appropriately by figure 5, which covers households' liabilities side. The households' indebtedness has been increasing steadily and faster than the rate of increase of net disposable income as it can be seen by the ratio of loans to net disposable income reaching the maximum of 64% thus a substantial fraction of households' income is tied to maintenance of debt alone limiting their ability of adjustment to a negative shock significantly, i.e. most probably households would decide to cut their consumption. Essentially, it tells us from another point of view households' relative ability of discretion in adjusting their structure of expenses in response to a negative shock to the flow of income while taking into account their liabilities side.

**Figure 4. Households - Social Benefits and Financial Savings (Source: Authors based on [2])**



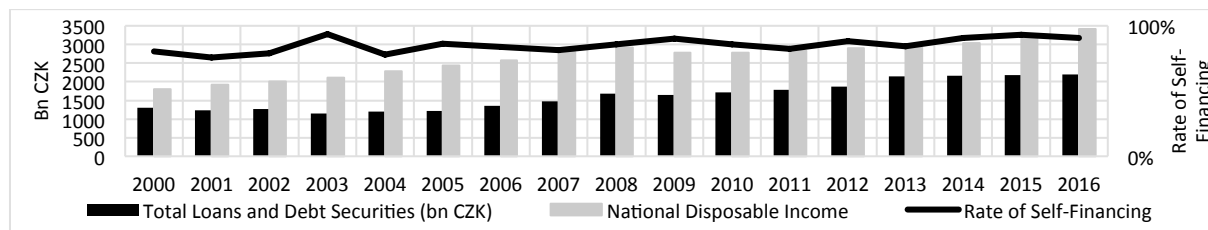
Additionally, there may be another interpretation, namely that it points to a rather large maturity mismatch in both households' assets and liabilities as well as in-flows/out-flows of funds. Coupled with a quite low rate of financial savings and steadily increasing rate of indebtedness, even though the disposable income has been increasing at the same time period, the sector of households' may be susceptible to problems meeting their obligations on payments due if there is an interruption in flow of cash-flow even for a relatively small period of time. Furthermore, in case of households the distribution of income is anything but "normal" or "homogenously" distributed implying different responses in adjustments to a negative shock both in terms of consumption as well as the stability of demand for loans.

**Figure 5. Households - Total Loans and Debt Securities (Source: Authors based on [2])**



The development of the sector of non-financial corporations differs from that of households somewhat in two important aspects. First, non-financial corporations react much more to overall economic activity than households in their adjustment of utilization of external financing, whereas households' amount of loans and other liabilities is increasing, non-financial corporations are more prudent. Second, non-financial corporations' rate of self-financing is on average reaching 90% implying that for a large part they finance their investments internally using retained profits. This is not a surprise, for contemporary availability of loans by a banking sector is much more favourable to households than to non-financial corporations as the perceived risk is higher in case of the latter.

**Figure 6. Nonfinancial Corporations - Total Loans and Debt Securities (Source: Authors based on [2])**



The figure 7 shows individual shares of domestic sectors on the total loans of Czech economy and provide additional point of view as far as the “debt positions” are concerned. The particular point of interest lies in combined magnitudes of government’s and households’ sectors, for they may provide an approximation of how the debt financing has been put to use if we take under consideration our aforementioned arguments. If, for sake of the argument, we make a rough adjustment of government share reflecting the structure of government expenditures and add households’ share, which may fairly be considered as debts that have been utilized in financing non-productive “investments”, we get a joint share of almost 43% on total loans and debt securities that have been allocated into either into financing (quasi)mandatory expenses and residential-housing needs and hire-purchases, which may hardly be considered a source of additional future cash-flow, quite the opposite actually. The interpretation of the financial corporations’ sector is problematic as far as our argument is considered but Czech Republic overall performance is export-oriented and the significance of financial sector lies mainly in supplying loans, not increasing “productivity”. That leaves us with the sector of non-financial corporations’, the interpretation of which shows that “only” 30% of debt financing may be considered to have been put into increasing future expected cash-flow.

**Figure 7. Share on Total Loans and Debt Securities of Whole Economy (Source: Authors based on [2])**



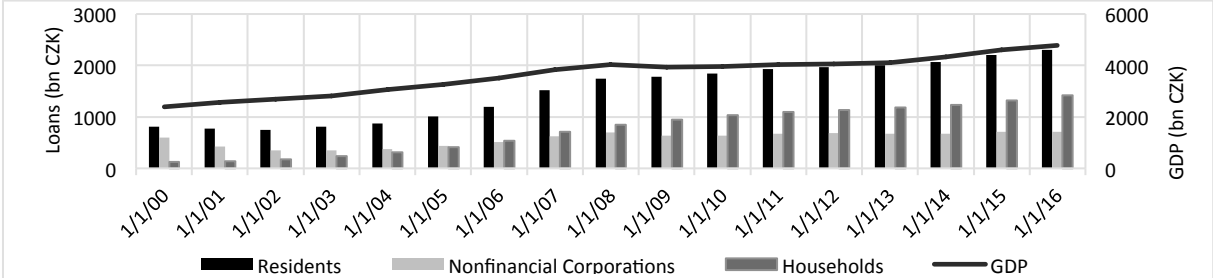
Nonetheless, our argument may still be considered as fairly misleading, for the needs of external financing of nonfinancial corporations is in absolute terms higher than those of households’, i.e. naturally, financing a large-scale industrial investment is more demanding than financing a purchase of a flat. However, one must bear in mind that, as we have tried to show above, on one hand, households’ margins of safety in terms of “cash” is very low but on the other their indebtedness relative to disposable income has skyrocketed thus even though their share may be considered relatively low, a negative shock to their expected cash-flow resulting from, for a simple example, negative economic development may precipitate potential problems in government debt management, i.e. maintaining the stability of indebtedness. Problems will be aggravated further if entrepreneurs’ outlook of expected profits grows grim at the same time thus decreasing investments, the extension of which will be a drop in the demand for loans, i.e. insensitivity of investments to changes in rates of interest.

#### 4 Monetary Policy and Counterpoising the Contraction of “Check-Book Money”

Hitherto, we have drawn the attention to the problem of various structures of different sectors of the economy and have omitted completely monetary policy stabilizing effects. Should the fiscal policy be ineffective in offsetting a decrease in cash-flow/profits, the monetary authority should step in and try to “jump-start” the economy by an expansive monetary policy,

however this could prove difficult due to (i) the money’s “point of entry” and to (ii) the way how money stock has been generated in the past. We ought to note that we shall focus on the relationship between the banking sector and a “real” economy, not the one between the central bank and the banking sector. Essentially, in our context there are two possibilities how a monetary policy may have a zero impact on a “real” economy. Considering a following situation, in an economy that is characterized by agents’ having relatively low margins of safety in “cash”, a crisis has come into existence resulting in agents’ inability of meeting their payment commitments due to a disruption in expected cash-flow, this will be reflected in their creditors’ worsening situation, i.e. the banking sector. Even if the central bank has proceeded to increase banks’ reserves so as to stimulate “supply” of loans, the additions to the *monetary base* will be “locked” in the banking sector because either the banks will be unwilling to grant loans, for the perceived risk has increased and it is reasonable to suppose that their profitability has sunk as well, or the aggregate demand for loans has dropped but most probably both effects will take their toll in unison. This may be the result of past developments. The sectoral structure of loans for Czech Republic is depicted in figure 8 and it is evident that the most significant part of money stock has been generated through loans to households and non-financial corporations.

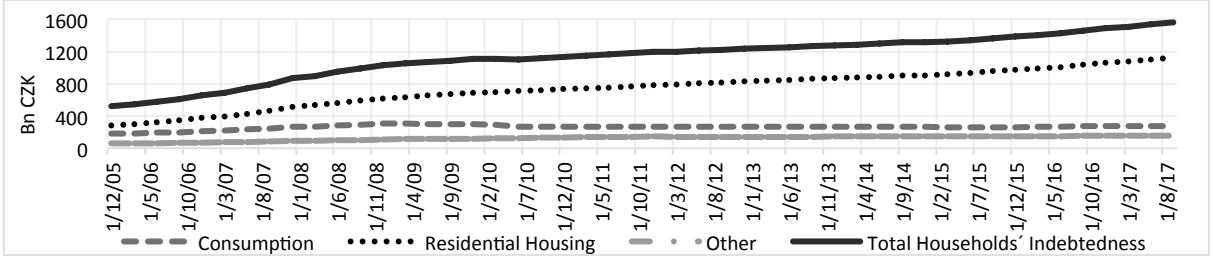
**Figure 8. Loans - Sectoral Structure (Source: Authors based on [1])**



The most interesting is the allocation of households’ sector, which is shown in figure 9. A prevailing share of total loans has been generated by funding residential housing that supports our conclusion in the proceeding part but now observed from the specific view of banking sector. The total households’ indebtedness as recorded by the Czech National Bank, which differs methodically from that of the National Accounts, has increased significantly but again their “contingency” funds have dwindled, which means that should they run into trouble the money’s main “point of entry” will be severed and at the same time banks will see the number of categorized loans soar. At this situation it is highly doubtful that households’ will be willing to pick up more debt, quite the contrary the terms of refinancing will get only harder; the result will most probably be a significant cut in their consumption. This hints at severe maturity mismatch that may threaten the stability of banking sector.

One of the basic “rules-of-thumb” in banks’ ALM is to match maturity of public’s deposits (liabilities in general) with that of loans (assets in general), i.e. a long term loan should be financed ideally via a long term deposit of the same maturity.

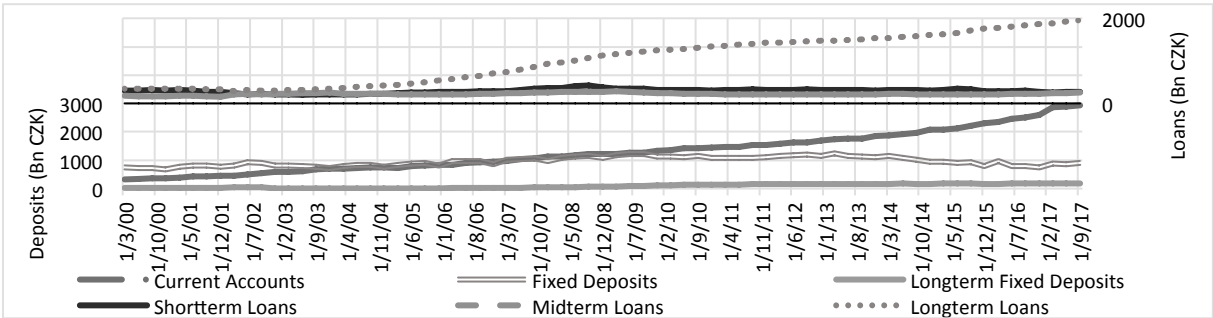
**Figure 9. Total Households’ Indebtedness (Source: Authors based on [1])**



The simplest way, and for our current purposes sufficient one, is to show the time structure of loans and deposits. Figure 10 shows a severe maturity mismatch in banks’ balance

sheets meaning that so far banks have been financing long-term loans with current accounts. Bearing in mind what has been said hitherto, should depositors start withdrawing their deposits and at the same time the flow of funds from loans be interrupted, it is questionable that any expansive monetary policy would be able to offset the contraction in the money stock. In such a situation both the demand for loans would plummet and banks' willingness to at least ease the terms of refinancing will not be forthcoming, even if the central bank lowers its main monetary policy instrument. The viable way of counterpoising the fall in the demand for loans would be via fiscal policy's intervention but that brings us back to the question whether, with the current structure of government spending, it would be able to muster enough funds to do so without increasing indebtedness significantly.

**Figure 10. Loans and Deposits - Time Structure (Source: Authors based on [1])**



And if so the burden will be put on the banking system's "shoulders" thus banks would not only need to offset the contraction of money stock and but also finance the government's needs while watching their health deteriorate. And if so the burden will be put on the banking system's "shoulders" thus banks would not only need to offset the contraction of money stock and but also finance the government's needs while watching their health deteriorate. The closest situation to our present case is that of fiscal dominance but in a state of over-indebtedness.

**5 Conclusion**

In the presented paper we have tried to hint at the structure of government spending and (public) debt as well as the structure of households' and non-financial corporations' sectors in relation to the banking sector. The room for discretionary fiscal stabilization policies is limited at best, considering that domestic economy has been "booming" for the last few years, households' indebtedness has soared but at the same time their "approximated" margins of safety are quite low, on the other hand it seems that the non-financial corporations have been more prudent in their management of utilization of external financing. However, should there be a disruption in the (aggregate) cash-flow, the economy may get into the "vicious spiral". The "Catch-22" situation lies in the realization that in times of distress characterized by over-indebtedness of both private and public agents, the economy is clenched - fiscal policy cannot offset the drop in level of profits, banking sector may not be able to offset contraction of money stock if the demand for loans drop, central bank may increase the liquidity in the banking sector but then, again, it comes down whether it will "spill" over into "real" economy. The problem with over-indebtedness is that once the realization of it has hit, money's all points of entry into the "real" economy becomes sealed or at least widely unreliable.

Nonetheless, our analysis is rudimentary at best, a more detailed account of the structure of maturity mismatch in balance sheets of economic agents' is needed. Particularly, a theoretical consideration of behaviour of households with different levels of income should be addressed, for these may to a large degree define the relative stability of households' demand for loans. Also, the "resolutions mechanisms" of bail-in/bail-out should be taken into consideration as these may be destructive in case of debt-deflation.

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# Evaluation of Fiscal Policy in the PIGS Countries under Conditions of Enhanced EU Fiscal Surveillance

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## Abstract

The aim of the article is to carry out an *ex-post* evaluation of fiscal policy in the PIGS countries (Portugal, Italy, Greece, Spain) pursued in 2003 - 2016, with particular emphasis on strategies implemented in response to the global financial crisis. High budget deficits, high level of public debt and difficulties in settling liabilities towards creditors were a characteristic feature of the PIGS countries belonging to the euro area. Coordination of economic policies within the EU and maintaining budgetary discipline is of particular importance for the functioning of the euro area countries, which results from the fact that they lost their sovereign monetary policies, but maintained sovereign national economic policies (including fiscal ones). A significant increase in indebtedness of the euro area countries during the financial crisis, which peaked in 2008-2009, forced reform of EU fiscal surveillance over member states.

Taking into account the EU's institutional arrangements introduced since 2011, the article identifies periods of fiscal consolidation, based on changes in the cyclically adjusted primary balances (CAPB), and then identifies changes in the fiscal policy stance under the influence of EU rules, examining the response of the output gap to changes in the fiscal stimulus.

*Keywords:* fiscal policy; fiscal consolidation; fiscal strategies; cyclically adjusted primary balance; output gap

JEL Classification: H60, H62, E62

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## 1 Introduction

The aim of the article is to carry out an *ex-post* evaluation of fiscal policy in the PIGS countries (Portugal, Italy, Greece, Spain) pursued in 2003-2016, with particular emphasis on strategies undertaken in response to the global financial crisis. The PIGS countries were selected for research due to their high budget deficits, high level of public debt and difficulties in settling liabilities towards creditors. The crises of public finances in the countries belonging to the euro area posed a serious threat to the functioning of the currency union, as they could even lead to its disintegration. Therefore, the economic governance system in the European Union, reformed since 2011, is of particular importance for the stability of the monetary union and the common currency. Debt crises in many EU countries, in particular the PIGS countries, have become the basis for the introduction of new institutional arrangements by the EU authorities, such as expenditure rule, rule specifying the required pace of public debt reduction, lower limit of structural balance and balanced budget rule. The aim of the article is also to assess the accuracy of the conclusions drawn from the financial crisis for the functioning of the monetary union and the European Union as a whole, taking into account the new economic governance.

## 2 Material and Methods

The article identifies similarities and differences in the fiscal policies implemented in the PIGS countries. The main parameters of assessment were as follows: public debt (% GDP), nominal budget balances (% GDP), real GDP growth (%), real GDP per capita and bond yields (%). Analysis of the fiscal position was carried out according to the Maastricht criteria. Assessment of the effectiveness of fiscal consolidation implemented in the PIGS countries was an important part of the research. Evaluation of fiscal policy in the PIGS countries aimed at

identifying changes in the fiscal policy stance, including its impact on the business cycle. We started with identifying the types of policy pursued in the period preceding the crisis, and in the period that followed the collapse in 2009. The research methodology was based on the division of fiscal policy into four types, which is commonly used in the literature [2], which can be shown on the coordinate system, where successive quadrants correspond to a specific type of policy: I quadrant - counter-cyclical fiscal tightening, II quadrant - pro-cyclical fiscal tightening, III quadrant - counter-cyclical fiscal expansion, IV quadrant - pro-cyclical fiscal expansion. The output gap estimates (OX axis) and the change in the cyclically adjusted primary balance (CAPB) in relation to the previous year (OY axis) were used to determine the type of policy. Counter-cyclical fiscal consolidation takes place when the state in a given year increases the CAPB during a period of a positive output gap. The second type of fiscal policy occurs when actions aimed at increasing the CAPB are accompanied by a negative output gap in the economy. The third and fourth types are characterised by fiscal expansion understood as a decrease in the CAPB. During a counter-cyclical fiscal expansion, changes in CAPB are accompanied by a negative output gap, and during a pro-cyclical expansion by a positive output gap. The research covered the PIGS countries in 2003-2016. Due to the fact that the European Commission does not publish data on the CAPB, data from the OECD report were used (Economic Outlook June 2017).

### **3 Results and Discussion**

#### *3.1 Enhanced fiscal surveillance as a component of new economic governance*

The reform of economic governance in the European Union resulted from a series of mistakes committed in the first decade of the functioning of economic and monetary union, which resulted from institutional gaps. Prior to the reform, the supervision of the economic policies of the member states essentially boiled down to fiscal surveillance. Low effectiveness of the instruments disciplining public finances of the EU member states enshrined in the Maastricht Treaty and the Stability and Growth Pact (1997) was one of the main reasons for the collapse of public finances during the financial crisis, which could have led to a disintegration of the monetary union and - more broadly - the European Union [10]. New arrangements were introduced as part of the "Six-Pack", the Fiscal Compact (2012) and the "Two-pack" (2013). The changes are aimed at strengthening fiscal surveillance, and, at the same time, at introducing macro-prudential supervision. The comprehensive approach to the economy through the assessment of the macroeconomic situation should be considered a strong point of the new system. As part of the changes, the European Semester was reformed, a mechanism for detecting macroeconomic imbalances was introduced and the system of financial sanctions was tightened. The new system imposes an obligation on countries with excessive deficit to prepare economic partnership programmes. The euro area countries have an obligation to inform the Commission and the Eurogroup of national debt issuing plans and to submit budget plans. The introduction of a longer-term budget planning is also significant. New fiscal rules such as the balanced budget rule (euro area countries), the rule on the pace of debt reduction (1/20 per year), the expenditure rule linking the rate of public spending with the rate of economic growth in the medium term have also been introduced. The public debt criterion has started to be treated equally with the budget deficit criterion [6]. In the reformed fiscal surveillance system, the importance of the medium-term objective (MTO), understood as the structural balance minus one-off and temporary measures, increased. The lower limit of the MTO for the euro area countries has been reduced to - 0.5% of potential GDP [7]. In disciplining public finances under the reformed surveillance conditions, new individual objectives were set for the PIGS countries in the medium term: Italy and Spain - the objective of structural balance, Portugal and Greece - aiming at structural surpluses.

The institutional weaknesses of fiscal surveillance before the reform are demonstrated, among others, by the lack of success in achieving lasting discipline of public finances in the PIGS countries. Excessive deficit procedures were imposed:

- a) on Portugal - 1) XI 2002 – V 2004, 2) IX 2005 – VII 2008, 3) XII 2009 – VI 2017;

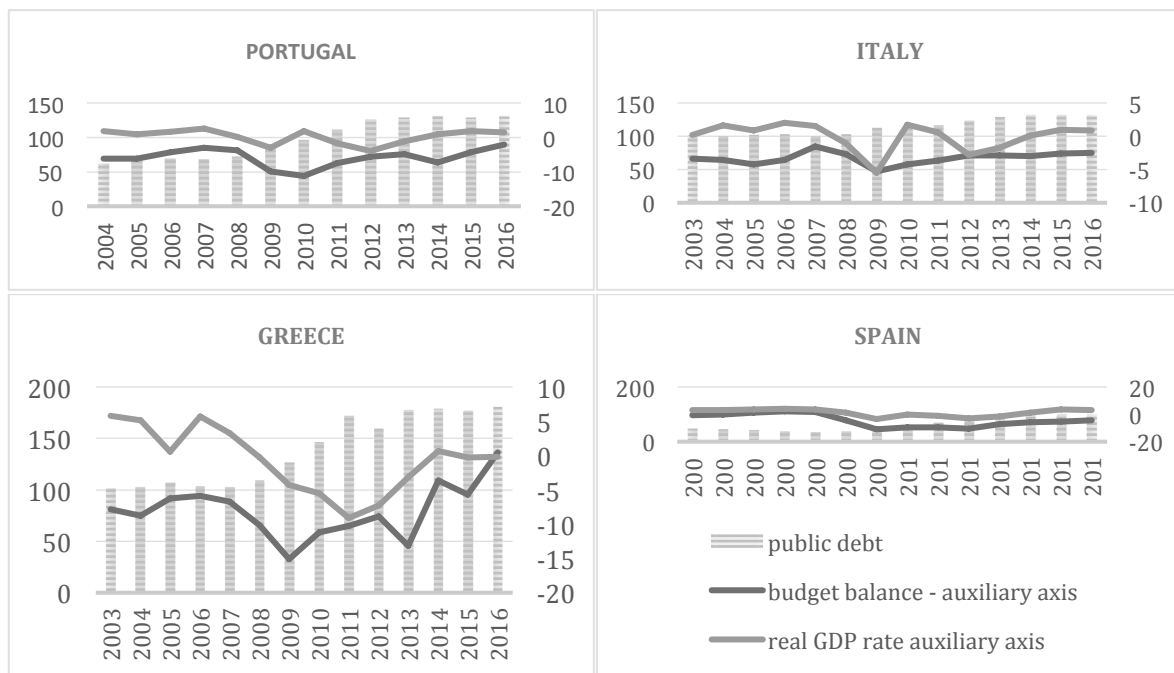
- b) on Italy - 1) VII 2005 – VI 2008, 2) VII 2009 – VI 2013,
- c) on Greece - 1) II 2004 – IX 2017,
- d) on Spain - 1) IV 2009 – ongoing procedure.

It follows from the above that under the new economic governance the EU Council decided to close the excessive deficit procedure against three of the PIGS countries.

### 3.2 Debt crisis in the PIGS countries - a different perspective

Figure 1 shows changes in the budget balance, public debt and GDP growth in the PIGS countries in 2003-2016. It is important to note that these countries, with the exception of Spain, had high public debt in relation to GDP in the period prior to the creation of the euro area. This debt has dramatically increased in all PIGS countries due to the crisis, which resulted in an increase in bond yields and, consequently, debt servicing costs and liquidity issues. According to Eurostat, in 2016, the public debt-to-GDP ratio in Greece was at 180.8%, in Italy at 132%, in Portugal at 130.1% and in Spain at 99%. Macroeconomic factors strongly determined public finances. The most difficult economic situation occurred in Greece, which recorded negative GDP growth between 2008 and 2016, with the exception of 2014. Spain and Portugal experienced negative GDP growth in 2009 and in 2011-2013. In turn, Italy had negative real GDP growth rate in 2008-2009 and 2012-2013. Budget deficits in relation to GDP reached their peaks in 2009 in Greece (-15.1%), Spain (-11%) and Italy (-5.3%). In the analysed period, Portugal recorded its largest deficit in 2010 at -11.2% of GDP.

**Figure 1. Budget balances (% GDP), public debt (% GDP) and real GDP growth rate (%) in the PIGS countries (Source: Own elaboration on the basis of Eurostat data.)**

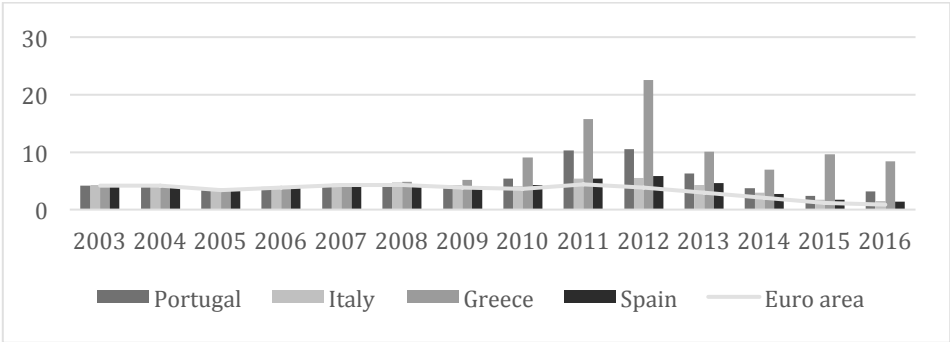


Among the many reasons for the growing public debt, described later in the article, in Greece, Spain and Portugal, the imbalance in the current account was crucial. In 2003-2010, the current account deficit of Greece ranged from 7.7 to 15.2% of GDP, while in Portugal from 7.2 to 10.7% of GDP. In Spain, the highest current account deficits occurred in 2006-2008 (9.0-9.6% of GDP). Only in Italy, despite the external imbalance persisting in 2003-2012, the deficit was moderate and only in 2010 exceeded 3.4% of GDP. The imbalance in the current account was not sufficiently identified as the cause of the growing public debt. Meanwhile, empirical studies carried out by [8], (pp. 22-33) with the use of the VAR model show that the imbalance in the

current account and the loss of competitiveness in relation to Germany were the main causes of the debt crisis.

Serious external imbalance in the euro area member states, due to the loss of independent monetary policy, lead to differences in interest rates, which is particularly evident in Figure 2 in the case of Greece and Portugal.

**Figure 2. Maastricht criterion bond yields (%) (Source: as in Figure 1.)**



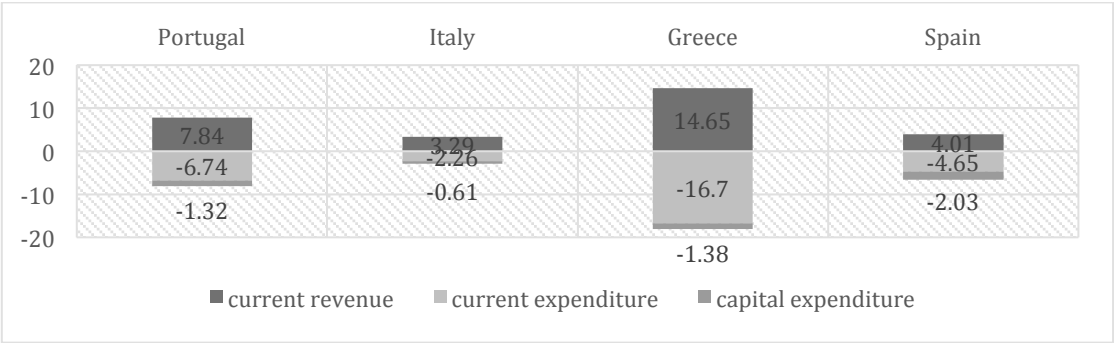
Note: central government bond yields on the secondary market, gross of tax, with around 10 years' residual maturity).

Some researchers [5] (pp. 50-56) suggest that the debt crisis in the EU should in fact be called a balance of payments crisis. The introduction of macroeconomic imbalance detection procedures into the EU economic governance system should be considered as appropriate.

**3.3 Consolidation measures**

The PIGS countries after the 2009 crisis have made a big effort to discipline public finances. Implementation of adjustment programmes was agreed with the EU authorities, and, in countries benefiting from financial assistance (Greece, Spain, Portugal), also with the ECB and the IMF. The analysis shows that the choice of the fiscal consolidation method is determined by the level of socio-economic development of a given country, the structure of public finances and the scope of required structural reforms. Figure 3 contains data on the size and structure of the total discretionary measures applied in 2010-2016. In all countries, consolidation was carried out with the use of measures on both the revenue and expenditure side. The consolidation effort was almost equally spread over both sides in Portugal (49.3% revenue, 50.7% expenditure). The consolidation strategy in Italy was more based on revenue measures (53.4%) and in Greece on expenditure measures (55.2). A clear difference in the composition of discretionary measures can be seen in Spain, which focused its adjustment activities in 62.5% on the expenditure side, and only in 37.5% on the revenue side. Consolidation was achieved by reducing capital expenditure.

**Figure 3. Discretionary measures used in fiscal consolidation in 2010-2016 (% GDP) (Source: own calculations on the basis of AMECO data.)**



All countries also used one-off and temporary measures (Table 1). In Greece, they were most significant in 2013, in Spain in 2012, and in Portugal in 2014. In Italy, one-off and temporary measures were of less significance.

**Table 1. One-off and other temporary measures in 2010-2016 (% of GDP) (Source: AMECO database.)**

Item	2010	2011	2012	2013	2014	2015	2016
Portugal	-2.70	-0.10	-0.08	0.26	-3.84	-1.24	0.44
Italy	0.21	0.42	0.13	0.27	0.22	-0.16	0.20
Greece	0.45	0.57	-2.31	-8.49	-0.03	-2.47	0.03
Spain	0.00	-0.24	-2.99	-0.44	-0.36	-0.33	-0.05

According to [1] (pp. 1-2), fiscal adjustments based mainly on the expenditure side are a more appropriate strategy, as it is assumed that it is more efficient in reducing the public debt-to-GDP ratio in the long term. In the case of expenditure-based fiscal adjustments, there is a weaker correlation with recessions than in the case of revenue-based adjustments. The pace of consolidation is also important [12].

When choosing the fiscal consolidation path it is necessary to take into account the specific features of individual economies. The PIGS countries differ in the level of socio-economic development (the highest GDP per capita in PPS in 2016 was Italy - 97%, and the lowest in Greece - 68% of the EU28 average). Italy is the only country in the PIGS group to be a net contributor to the European Union (operating cash balance is about -0.2% of GNI) and the only one that did not benefit from financial assistance in connection with the financial crisis. The structure of debt holders in particular PIGS countries was important for the financial stability, as well as the scale and form of financial assistance required. While in Portugal and Greece the share of non-residents in debt financing was high (60-70%), in Italy and Spain the debt was mainly financed by residents. Therefore, the observation [11] (pp. 189-221) that the public debt issued by the government of a country belonging to the euro area and held by residents of other euro area countries is always a foreign debt, even though these investors use the same currency and belong to the same currency area, is accurate. During a period of uncertainty and economic problems, foreign investors sell bonds which may lead to a self-fulfilling crisis, which is particularly evident in Greece. The reasons for the debt crisis in Greece, in addition to the above-mentioned ones, include increased expenses related to the electoral cycle, high expenditure on national defence, generous remuneration policy and large size of the shadow economy (around 25-30%). [9] (p. 334) also raise the problem of corruption and inefficient public sector, even concluding that "The only hope for the Greek people is for the Eurozone to dictate stringent conditions that rescue its people from its own government". In Greece, as in Italy, the migration crisis is also the cause of public finance tensions. The crisis in the housing market is, in turn, behind the explosion of public debt in Spain.

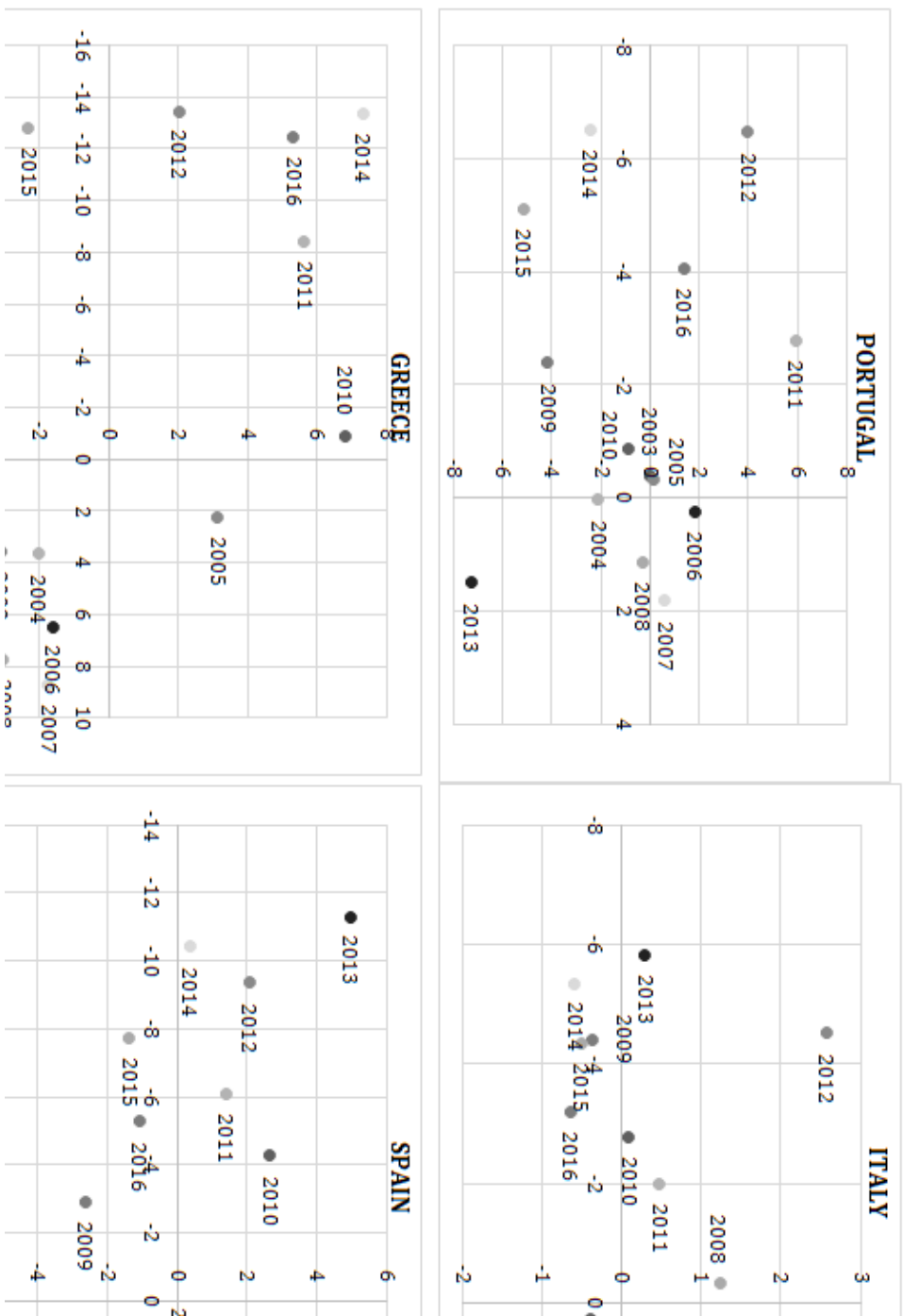
The choice of the path of disciplining public finances has affected the populations to varying degrees. The risk of poverty or social exclusion between 2009 and 2016 increased the most in Greece, by 8 pp (up to 35.6%). In the same period, the index increased by 5.1 pp in Italy (up to 30.0%) and only by 0.2 pp in Portugal (25.1).

In Spain, between 2007 and 2016, there was an increase of 4.6 pp (up to 27.9), with the EU28 average in 2016 at 23.1%.

### 3.4 Analysis of the fiscal policy stance in the PIGS countries in 2003-2016

Using the method described in point 2, the change in the fiscal policy stance under the influence of the crisis was identified, as illustrated for each country on the coordinate system (Figure 4). The analysis shows that in Portugal, in the period preceding the crisis, there were 2 episodes of pro-cyclical fiscal tightening (2003-2005), pro-cyclical fiscal expansion (2004-2008)

Figure 4 Identification of types of fiscal policy pursued in the PIGS countries in 2003-2016 (Source: Own elaboration on the basis of OECD d - November 2017 (27.12.20))



and counter-cyclical fiscal tightening (2006-2007). Since the beginning of the crisis, the fiscal policy stance has been shifting between counter-cyclical fiscal expansion and pro-cyclical fiscal tightening. After a period of pro-cyclical tightening in 2011-2012, there was a counter-cyclical fiscal expansion (2014-2015) followed again by a pro-cyclical tightening (2016).

In Italy, in 2003-2006, an expansionary fiscal policy was pursued. In 2007, there was an episode of strong counter-cyclical fiscal consolidation (in the conditions of a positive output gap, fiscal policy was tightened), which brought about a clear improvement in the budget balance. Counter-cyclical consolidation was sustained in 2008. In the remaining years, the policy pursued can be defined as counter-cyclical fiscal expansion. The exception is in 2012, in which an episode of pro-cyclical fiscal tightening occurred.

In Italy, in the period preceding the crisis and in the year of its outbreak (2009), pro-cyclical fiscal expansion dominated (6 years), with the exception of 2005, in which an episode of fiscal consolidation occurred. In the period from 2010, pro-cyclical tightening (consolidation) dominated, with the exception of episodes in 2013 and 2015, in which the discretionary measures indicated a counter-cyclical fiscal expansion (deterioration of the balance in the conditions of high negative output gap).

It is difficult to clearly identify the type of fiscal policy in pre-crisis Spain. Despite the positive output gap between 2007 and 2008, a pro-cyclical fiscal expansion took place. The fiscal expansion was maintained in 2009, however, it was of a counter-cyclical nature. The output gap until the end of the observation period, i.e. until 2016, remained negative each year, reaching the highest level in 2013 (-11.3%). This changed the stance of fiscal policy, which in 2010-2014 had the features of pro-cyclical fiscal consolidation, while in 2015-2016 by a pro-cyclical expansion was applied.

The analysis of the fiscal policy stance in the PIGS countries shows that there is no clear regularity in the implemented strategy of consolidation of public finances. One can rather talk about the phenomenon of randomism, which was the result of rapid changes in the real economy (business cycle) as well as in the social (protests, strikes, impoverishment of society) and political (electoral cycle) spheres.

#### **4 Conclusion**

The arrangements functioning in the framework of the new economic governance should be assessed positively, because they enabled to discipline public finances of the EU countries (in 2009-2011, the EDP procedure covered 24 out of 27 EU countries, and in 2017, 3 out of 28 countries). New institutional arrangements have been applied to the PIGS countries, but inconsistently: the EU Council has refrained from imposing fines against Portugal and Spain - a manifestation of the pragmatism of the EU authorities. The Council acknowledged the arguments of both countries that they had carried out large and successful fiscal and structural adjustments in the period when financial assistance was provided. Spain has argued that deflation had negative impact on fiscal adjustments and estimates of potential output [4]. The fact that decisions were made in the conditions of uncertainty regarding the results of the Brexit referendum was also crucial [3]. Membership in the euro area of the surveyed countries and the fact that they were covered by the recovery (aid) programmes resulted in an increased credibility of these countries and, consequently, in lower interest payments. These savings have not necessarily been used to repay the debt, but to increase primary spending in order to boost the economy. The analyses show that the creation of the euro area was premature due to the low degree of real and social convergence, which should be a lesson both for the monetary union and the EU countries outside the euro area. The results of our analyses of the public finance consolidation strategies in the PIGS countries in various economic conditions and under changing supervisory framework on the part of the EU may have universal significance. They can be useful for adopting a type of fiscal policy (tightening - loosening) depending on the phase of

the business cycle, socio-economic development and the structure of public finances of a given country. Due to the relatively short period of the new economic governance, further research on whether the introduced arrangements, in addition to the main objectives of stabilising public finances and minimising the risk of further financial and economic crises, foster the convergence of the economies of the countries belonging to the monetary union, is necessary.

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# Compliance and the Management of Contributory Pension Scheme in Nigerian Public Service

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## Abstract

The management of retirement benefits especially in the public sector has been one of the major challenges to all government in Nigeria, in response to this challenges, the Federal government established the National Pension Commission to regulate pension matters in the country through a new pension scheme in the year 2004, which is contributory in nature. The Commission as a regulatory body issued licences to Pension Administrators and Custodians to take care of the pension matters. Over the years however, in spite of monumental reforms contained in the new pension Act, the management of the contributory pension scheme has not achieved the desired results. The major objective of this paper is to examine the relationship between compliance and the management of contributory pension scheme in Nigerian Public Service. The study employed survey research designed and a simple Linear Regression analysis. The findings of the study revealed that compliance with rules and regulations by operators has positive relationship with the management of contributory pension scheme. Based on the findings, it was concluded that there was adequate control mechanisms (rules and regulations) put in place by the National Pension Commission for pension managers in Nigeria; that the control mechanisms are in compliance with the international best practices for effective pension management. Therefore, the study recommended that the National Pension Commission should institute stiffer control mechanisms (rules and regulations) in order to avoid delay in pension remittance.

*Keywords: compliance; pension; management; public service*

JEL Classification: H55

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## 1 Introduction

Every society, whether embryonic or modern, faces a number of problems to which reliable and workable solutions must be provided. One of the challenges being faced by developing economies states which Nigeria belongs, is the provision of better life to pensioners with the ultimate objective of enhancing their wellbeing and reducing their level of poverty [2]. One of the ways of achieving this is through Pension Scheme. Nigeria reformed its pension system due to many problems confronting both the public and private sectors. The public sector operated largely as the Pay-As-You-Go scheme, which depends on budgetary provisions from various tiers of government for funding. Under the Defined Benefit (DB) Scheme, contributions were not generally made, and projections were required to be made of the pension entitlements of each employee by the employer, determined by the employee's years of service and earnings.

The current shift in understanding of the modern trend on the subject matter brought about the gradual move towards diverse pension arrangements (either through individual accounts or collective schemes), where the future pension provisions are backed by the assets. This trend is visible in many countries around the world, where the new pension schemes have been established in which Nigeria is not an exception. The key outcome of the processes just described is the situation, in which a significant number of future pension claims are becoming asset-backed. In this situation, a significant part of the future pension provisions are becoming directly dependent on the future discounted yields that are to be delivered by these assets. However, the increased linkage between the levels of future pensions and the performance of

invested assets leads the participants into the situation when part of their retirement income will be subject to the market uncertainties connected with the investment process.

Moreover, the issue of how to manage pension provision and old age support in both developed and developing countries is generating attention. The World Bank's 1994 report raised the outline of ageing as an issue in the context of development policy, but within an unfortunate context of 'crisis' [17]. Although, the report recommended developing countries to adopt multi-pillar pension systems, the Bank subsequently focused almost exclusively on supporting the introduction of individual retirement savings plan [17].

Prior to the Pension Reform Act 2004, in Nigeria, most public organizations operated a defined benefit (pay-as-you-go) scheme. Final entitlements were based on length of service and terminal remunerations. The Defined Benefit (DB) Scheme was funded by Federal Government through budgetary allocation and administered by pensions Department of the Office of the Head of Service of the Federation [3].

The pension scheme became a great burden on the government, as it could no longer cope with the payment of pension and gratuities to retiring workforce. This is apparently due to the fact that there was no plan put in place to forestall these challenges. Therefore, managing and administering pension funds have continued to pose a great challenge to government in Nigeria [13]. Further, Adejoh [1] identified some of the major challenges surrounding the administration of pension scheme in Nigeria. Among the major challenges he cited includes remittance of the benefits, genuineness of our pension fund administrators, staff capacity and inadequate legal framework to support implementation.

The Nigerian Pension Act of 2004 established the National Pension Commission as a sole regulator and supervisor of all pension matters in the country (Pension Reform Act, 2004:1). Similarly for the first time in history, Nigeria established a single regulatory body for the pension industry while the scheme is managed by Pension Fund administrators and the Pension Fund Custodians warehouse of the retirement benefits. This massive decision that holds the future of retirees in public-private sectors requires a study for the future of public and private services in the country.

Since the inception of the scheme in Nigeria by 2004, not much effort has been made, especially by researchers to examine the management of the scheme and other performance-related issues. It is therefore against this backdrop that the study was conducted to examine the management of contributory pension scheme in Nigerian Public Service. The major objective of this paper is to examine the relationship between compliance and the management of contributory pension scheme in Nigerian Public Service with a view to coming out with a better ways of pension management in Nigeria. Therefore, compliance with rules and regulations by operators does not affect the management of Contributory Pension Scheme in Nigerian Public Service.

## *1.1 Conceptual Issues*

It is indispensable to briefly touch on some important concepts that are deemed to be very relevant to the study, so as to avoid ambiguity and ensure proper understanding of the problem in question.

### *1.1.1 Concept of Management*

In the words of Vishnoo and Vidya [16], management is the triumph of predetermined objective through the efforts of other people. Fayol [15] opined that management is a process that must be carried out at all levels of organisation, and its main elements include planning, organising, commanding, coordination and control among others. More broadly, management refers to the process of designing as well as maintaining an environment in which individuals, working as a group, efficiently accomplish individuals and groups goals [9]. It is against the

above painted pictures that the concept of management; as applied in this research; refers to the process of implementing or administering of the new pension scheme in Nigeria.

### 1.1.2 Compliance: Conceptualization

PenCom [14] defines compliance as the structure put in place that requires an organisation to comply with Laws, Rules and Regulations. Compliance in this study refers to adherence to the provisions of the Pension Reform Act 2014, including regulations, circulars, codes and guidelines issued by the Pension Commission. It is the control mechanism put in place to ensure effective management and safeguards pension funds and provide easy access to retirement benefits by all retired workers, as at when due.

## 2 Material and Methods

The term methodology is a system of explicit rules and procedures in which research is based and against which claims of knowledge are evaluated.

A survey design was adopted for the study. The population of the study consisted of staff of the National Pension Commission (420), Premium Pension Limited (410), First Custodian Pension Limited (18) and Ahmadu Bello University, Zaria Nigeria (10,710) with a total number of 11558 members of staff. To determine the sample size for the study, Krejcie and Morgan's [10] table was used to arrive at 370. A Simple Linear Regression was employed to analyse the data for the study using Statistical Package for the Social Sciences (SPSS) version 20.

## 3 Results and Discussion

The instrument used for data collection for the study has gone through an internal consistency test which measured the degree to which items that made up the instrument were measuring the same underlying attribute. It measured the extent to which the items in the instrument 'hang together'. This means that reliability test shows how the items in the instrument measure the construct under study. Nunnally [12] recommends a minimum of 0.70 Cronbach alpha. However, the following are recommended and reliable Cronbach alpha coefficients, 0.81-0.95 is a very good reliability, 0.71-0.80 is considered a good reliability, 0.60 - 0.70 is considered fair. Therefore, this study adopts 0.70 thresholds as suggested by Nunnally [12] in measuring the internal consistency of the instrument. Below is the summary of the reliability test results for all the variables.

**Table 1. Summary of Reliability Analysis of Variables (Source: Field Survey, 2017.)**

Variables	No. of items	No. of items deleted	Cronbach's alpha
<b>Dependent Variable:</b>			
Pension Management	3	0	0.709
<b>Independent Variable:</b>			
Compliance	3	1	0.501

Table 1. Shows that the Cronbach's alpha for pension management was 0.709, which means that 70.9% of the items measure the construct. Also, the Cronbach's alpha for compliance was 0.501 which indicates that 50.1% of the items were good measures of the construct. The coefficients for both dependent and independent variables fall within the acceptable thresholds. Thus, the general reliability of the instrument can be said to be good.

**Table 2. Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.454a	.206	.202	1.63740	1.800

- a. Predictors: (Constant), Compliance
- b. Dependent Variable: PMQ

The R Square for the study as shown above (Table 2.) is 0.206. This indicates that 20.6% of the variability in management of contributory pension scheme (dependent variable) has been significantly explained by the independent variable under study. This means that the independent variable can predict the dependent variable by 20.6% which implies that compliance relationship accounts for 20.6% variance in management effectiveness of the scheme.

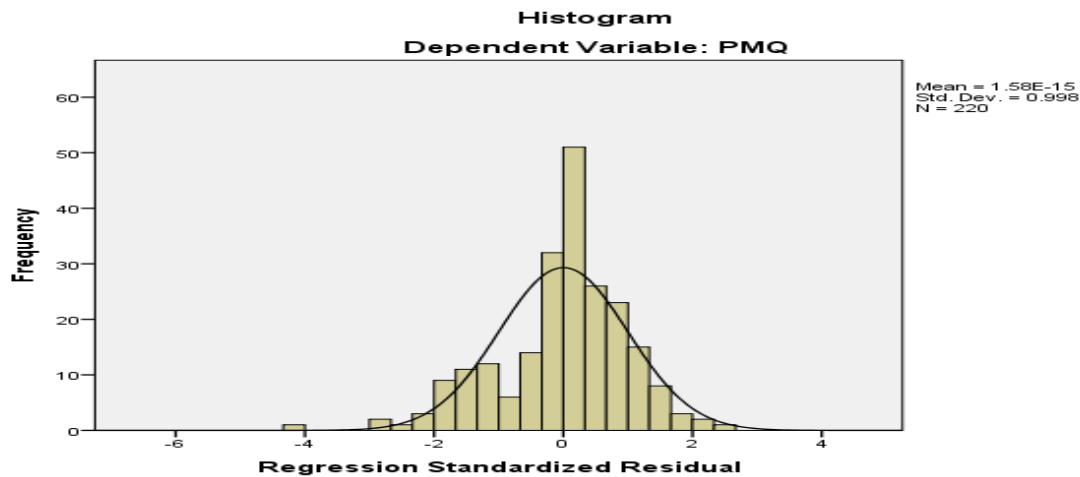
**Table 3. ANOVA<sup>b</sup>**

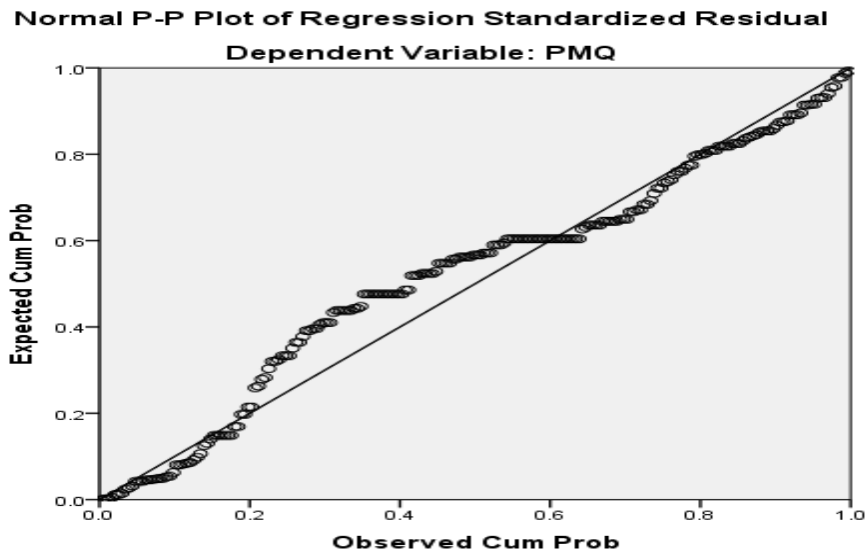
		Sum of Squares	df	Mean Square	F	Sig.
<b>1</b>	<b>Regression</b>	151.761	1	151.761	56.604	.000b
	<b>Residual</b>	584.474	218	2.681		
	<b>Total</b>	736.234	219			

- a. Predictors: (Constant), Compliance
- b. Dependent Variable: PMQ

The ANOVA table 3. indicates that the model as a whole is significant, considering the Sig. F Change value ( $F(1, 218) = 56.604, p < .0005$ ). The level of significance is .000 which shows that the analysis of variance for the study has fallen within the acceptable standards. This shows that the model is good and fit for the study. Hence, the variable of the study are well selected and properly capture the effect of compliance in the Management of Contributory Pension Scheme in Nigerian Public Service.

To meet the normality assumption, below are the histogram and the P-P Plot.





The distribution of the plots needs to be normally distributed. This means that the assumption of normality is met when the residuals fall along the diagonal with no substantial systematic departures and can be examined from the histogram of the standardized residuals and the Q-Q plots (Hair et al., 8). From the above normal histogram shows that the normality assumption was met since almost all the bars on the histogram were very close to the normal curve.

Linearity assumption was also met because the analysis of the residuals did not show any nonlinear pattern. Linearity assumption requires that the relationship between the independent and dependent variables is linear. Similarly, to meet the assumption of independence of error term, Durbin Watson was used. Norusis (11) reported that if the Durbin Watson value falls between 1.5 and 2.5, the assumption of independence of error term is not violated. The Durbin Watson for this study was 1.800 as shown above, hence it met the assumption.

**Table 4. Coefficients<sup>a</sup>**

Model	B	Std. Error	Beta		
1 <b>(Constant)</b>	3.961	.654		6.054	.000
<b>Compliance</b>	.529	.070	.454	7.524	.000

a. Dependent Variable: Pension management

Table 4. shows that the independent variable (compliance) has made a unique contribution in explaining the variance in the dependent variable (management) by 45.4%. The contribution is statistically significant at p value = .000.

From table 4. above, the null hypothesis which states that 'Compliance with rules and regulations by operators does not affect the management of Contributory Pension Scheme in Nigerian Public Service', was rejected by the statistical analysis at level of significant (p) value = .000, and beta ( $\beta$ ) coefficient = .454, which implies that Compliance with rules and regulations by operators has a significant impact on the management of contributory pension scheme in Nigerian Public Service. This shows that the independent variable (compliance) has made a unique contribution in explaining the variance in the dependent variable (management) by 45.4%. The contribution is statistically significant at p value = .000.

The findings of the study revealed that compliance with rules and regulations by operators has positive but moderate relationship with the management of contributory pension scheme and was statistically significant in explaining variability in the management of contributory pension scheme. The results show that there was adequate enforcement of rules and regulations put in place by the National Pension Commission for pension managers in Nigeria. The control

mechanisms are in compliance with the international best practices for effective pension management scheme. It was discovered that the control measures have significantly helped in remittance and timely payment of retirement benefits in most organizations. Similarly, it was found out that most organizations comply with the pension rules and regulations as enshrined in the Pension Act. The findings also confirm the findings of other scholars 2012 [14], 2012 [5] and 2013 [4].

#### **4 Conclusion and Recommendation**

Pension scheme is something that cannot be treated with levity. It should go beyond casual approach by any serious government. Successful governments have tried to encourage pension scheme from colonial period to date but the past and present civilian administration has carried several upward reviews to improve the lots of retirees and pensioners in the country. This is commendable. The findings of the study revealed that compliance with rules and regulations by operators has positive relationship with the management of contributory pension scheme. Based on the findings, it was concluded that there was adequate control mechanisms (rules and regulations) put in place by the National Pension Commission for pension managers in Nigeria; that the control mechanisms are in compliance with the international best practices for effective pension management. The control measures have significantly helped on timely payment of retirement benefits in most organizations and that most of these organizations comply with the pension rules and regulations as enshrined in the Pension Act.

Therefore, the study recommended that, the National Pension Commission should institute stiffer control mechanisms (rules and regulations) in order to avoid delay in pension remittance. More local and foreign seminars, and workshop should be conducted regularly to sensitize both workers, staff, management and pensioners this will go a long way in checking indiscipline and abuse by Pension Fund Administrators, Pension Fund Custodians and Employers of labour. Furthermore, the Commission should intensify enlightenment campaigns on the operations and working system of the pension scheme as this has the potential to enhance compliance with the rules and regulations.

This research was conducted using only some few stakeholders and selected public organisation in Nigeria. The same study may be replicated by using a larger sample size through addition of more organizations in order to have a wider geographical coverage with a view to increasing the prospects of generalization. Future studies may also use different tools of analysis to examine the Compliance and the Management of contributory Pension Scheme in Nigerian Public Service. Furthermore, Pension Benefits may be studied independently against Management of the Scheme by future researchers to see if similar findings would be made. Similarly, other measures could be added to the scale applied to management or administration to determine its effect on Management of Contributory Pension Scheme.

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# Labor Income Taxation in Open Economies: Current Trends and Options for Reforms

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## Abstract

We analyze both the theoretical framework of labor taxation in the open economy and important current reforms of labor taxation in countries worldwide including the introduction of “social VAT”. The current tax theory considers the reforms of labor income taxation related to the shifting of taxation from more mobile tax bases to the less mobile ones, taking into consideration the reduction of tax rates with simultaneous broadening of the tax base. Such a reform is intended to reduce the distortion effects of taxation, and, as a consequence, to reduce the tax burden on labor. The empirical section includes analysis of indicators of labor income taxation in OECD countries. We calculated the progressivity index of overall tax wedge and its components – personal income tax, employer’s and employee’s social security contributions. The results enabled cross-country comparisons: we found that in a most OECD members both employees’ and employers’ social security contributions systems are regressive or flat, while personal income tax systems are progressive in all countries except Hungary with flat tax schedule. Moreover, in OECD countries with highest GDP per capita the employees bear average labor tax burden with simultaneously low employers’ social security contributions rates.

*Keywords: personal income tax; social security contributions; consumption tax; social VAT; progressivity*

JEL Classification: E20, H22, H24, P51

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## 1 Introduction

In modern economies, the tax burden on labor typically includes personal income taxes and social security contributions paid by both employers and employees. In most of countries worldwide the structure of personal income tax is quite complex (in contrast to social security contributions) and includes several tax brackets, different tax rates, tax incentives etc.

Taxes on labor income have a direct impact on business activities influencing on both labor demand and labor supply levels, and indirect impact through government spending (based on tax revenue) related to the financing of provision of social goods and services.

The taxation of labor leads to the reduction of employment in the formal sector of economy and consequently to the increase of employment in the informal sector, to the reduction of both output and employment in industries using primarily low-skilled and low-paid workforce, and also to the increase of domestically produced output, i.e. goods and services, produced and consumed in the household without being distributed by market channels.

The openness of the economy leads to the new challenges, related to the international tax competition and tax incidence, which often aggravate the problem of shifting the corporate tax burden on labor. These issues are particularly topical for the small open economy with no competitive power in international markets.

The mentioned problems and their consequences reduce economic efficiency of labor taxation. The tax distortions violate basic principles of equity and neutrality and slow down economic growth. The progressivity of taxation allows to come close to the achieving the equity principle, but it simultaneously violates the neutrality. In turn, consumption tax with broader base and uniform rate makes possible to maintain some degree of neutrality, but with simultaneous failure of equity principle.

So, today the reforms of labor taxation, aimed to address these distortions and to ensure the effective distribution of resources, are actively discussed in societies.

Accordingly, the purpose of the paper is to evaluate main indicators of labor taxation and the progressivity of tax wedge and its components in OECD countries.

The article is structured as follows. First, we briefly discuss the theoretical background of labor income taxation in an open economy and main current trends of labor taxation reforms. The empirical part includes analysis of indicators of labor income taxation in OECD countries. Notably, Section 2 presents material and methodology, and Section 3 describes results and discussion. Section 4 concludes.

## 2 Material and Methods

For today, the economy of almost all countries worldwide more or less can be considered as open – goods and services, capital and labor move across the borders.

According to the tax theory, for the small open economy the source-based capital tax, taking into account the perfect mobility of capital and immobility of labor, would never be optimal, because the small economy have no market power to change the rate of return of its residents or other capital owners, in other jurisdictions. In this case, the tax burden falls entirely on the immobile labor [1; 8].

Taking this into consideration the taxation of labor income of employers is more effective. Moreover, the higher is the degree of market integration, the more the rate of employment depends on tax changes [2; 4; 5; 7].

The strengthening or weakening the government’s role as the guarantor of risk minimization in the open economy depends crucially on the level of labor mobility. And, since the labor mobility increases permanently, such function of the government tends to weaken [19, p. 28-31].

The current tax theory considers *two main directions of reforms of labor income taxation*: the shifting the burden of taxation from income to consumption and/or property, and the broadening of the tax base by reducing tax rates and by eliminating main tax incentives.

In the context of labor taxation, it means the reduction of tax burden borne by labor in order to increase employment and enhance economic growth.

Basic arguments in favor of such tax reform in an open economy include the following. Shifting taxes from labor to consumption can generate the same revenue with lower tax rates and lower distortions since the latter is financed by a number of sources other than labor income – intergovernmental transfers, savings etc. In addition, the openness of the economy means the lower mobility of labor income comparing with corporate income since workforce overall is less mobile than capital [16].

At the same time, the main consumption tax (the VAT) has relatively immobile tax base because it is levied according to the destination principle [3; 6]. This makes its base even less mobile than the labor income, quite apart from real estate, which is the least influenced by globalization processes.

Accordingly, the VAT is the main “alternative” of labor taxes due to its large tax base, and the increase in VAT rate is considered as the major component of tax reform. It is referred to the so-called “social VAT”, which partially replaced social security contributions in several countries (Table 1.).

**Table 1. “Social” VAT in OECD countries (Source: author, based [9]; [10]; [12]).**

Country	Year of introduction	Key features
Denmark	1987	2% increase in VAT rate for (to 21%) with simultaneous abolishment of compulsory social security contributions for employers
French overseas territories	1994	The reduction of social security contributions rate, paid by employers, with simultaneous increase in VAT rate from 7,5% to

		9,5%.
Germany	2007	3% increase in VAT rate (to 19%) with simultaneous 1,8% reduction in employers' social security contributions rate
Hungary	2009	5% increase in VAT rate (to 27%) with simultaneous 5% reduction in employers' social security contributions rate (to 22%)
Japan	2014	5% increase in consumption tax rate (to 8%) with simultaneous abolishment of compulsory social security contributions, paid by employers to the state pension funds.
France	2007	The discussion was started, but currently there are no concrete results on this issue
Belgium	2015	

The consequences of introduction of “social” VAT in countries with progressive and flat schedules of labor income tax are usually evaluated with macroeconomic simulation models. Their results show positive effects in the medium-term (the increase of demand on labor due to reduced labor costs), despite the short-term negative effects as a result of increase in consumer prices subsequent to the increase in VAT rate.

Also in an open economy, there are several positive effects on the competitiveness of domestic producers on both domestic and foreign markets, especially with fixed exchange rate. They benefit in the domestic market, since importers pay the increased VAT, without any gain from reduced labor costs. The domestic exporters also increase their competitiveness in foreign markets due to reduced labor costs.

However, the effects of introduction of “social” VAT both for progressive and flat tax schedules depend crucially on model assumptions and on economic and institutional environment of the country. Notably, the evaluation of such a reform in Hungary, which has flat schedules of labor income taxation (see below), is substantially complicated by consequences of global financial crisis 2008-2009, by decisions of national government, and by presence of informal economy. The latter means that administrative costs and possibilities for tax evasion differ for consumption taxes and labor income taxes [13, p. 26-27].

Now in USA the House Tax Cuts and Jobs Act is actively debated. It is a kind of a revenue neutral tax plan aimed to reduce personal income tax rates for middle-income groups, to raise the consumption tax, and to expand the Earned Income Tax Credit. According to estimates, such measures can contribute to economic growth [11; 18].

In terms of progressivity, such a reform involves reduction of progressivity of labor income taxation and reduction of its marginal rates, especially for higher tax brackets. In OECD countries the sum of personal income tax, levied by different levels of government (state, provincial, cantonal, or local), employee and employer social security contributions and payroll tax less cash transfers, if any, determines the tax wedge, which is usually expressed as a percentage of labor cost.

Therefore, to evaluate the progressivity of tax wedge and its components in OECD countries we used comparative and graphical analysis.

The relevant quantitative analysis is based on data for OECD countries over the period for 2000-2016, provided by OECD Statistics.

### 3 Results and Discussion

Over the last three decades, OECD countries provided more than 3000 reforms, related to the labor income taxation. Their largest part addressed personal income taxation. Italy and Ireland provided maximum number of such transformations – 121 and 199 respectively, while Austria put in practice only 14.

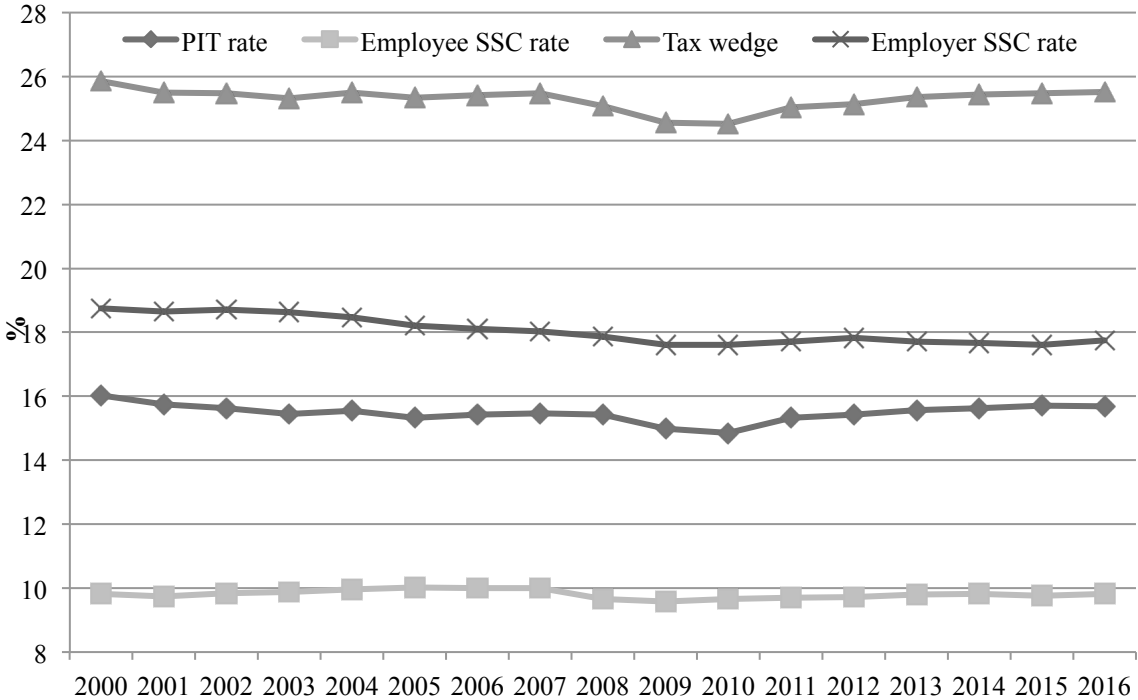
The number of reforms related to the employers' social security contributions exceeded more than 1,5 times the quantity of reforms associated with employees' social security contribution. Whereas, with regard to social security contributions rate, the majority of reforms

increased it for employers' social security contributions, and reduced – for employees' social security contributions.

According to OECD Taxing Wages 2017 now the maximum tax wedge is in Belgium (53,96%), while the minimum – in New Zealand (17,89%). But in New Zealand there are no compulsory levies on social security, only voluntary, paid by both employers and employees, which are not reflected in OECD official statistic reports. Employers in Denmark have similar possibility to pay social contributions to the unemployment fund voluntarily.

Fig. 1. presents main indicators of labor income taxation in OECD countries.

**Figure 1. Main indicators of labor income taxation in OECD countries for 2000-2016 (Source: author, based on [14]; [15]).**



Note: henceforth we use indicators based on a single person at 100% of average earnings, with no child;

SSC – social security contributions.

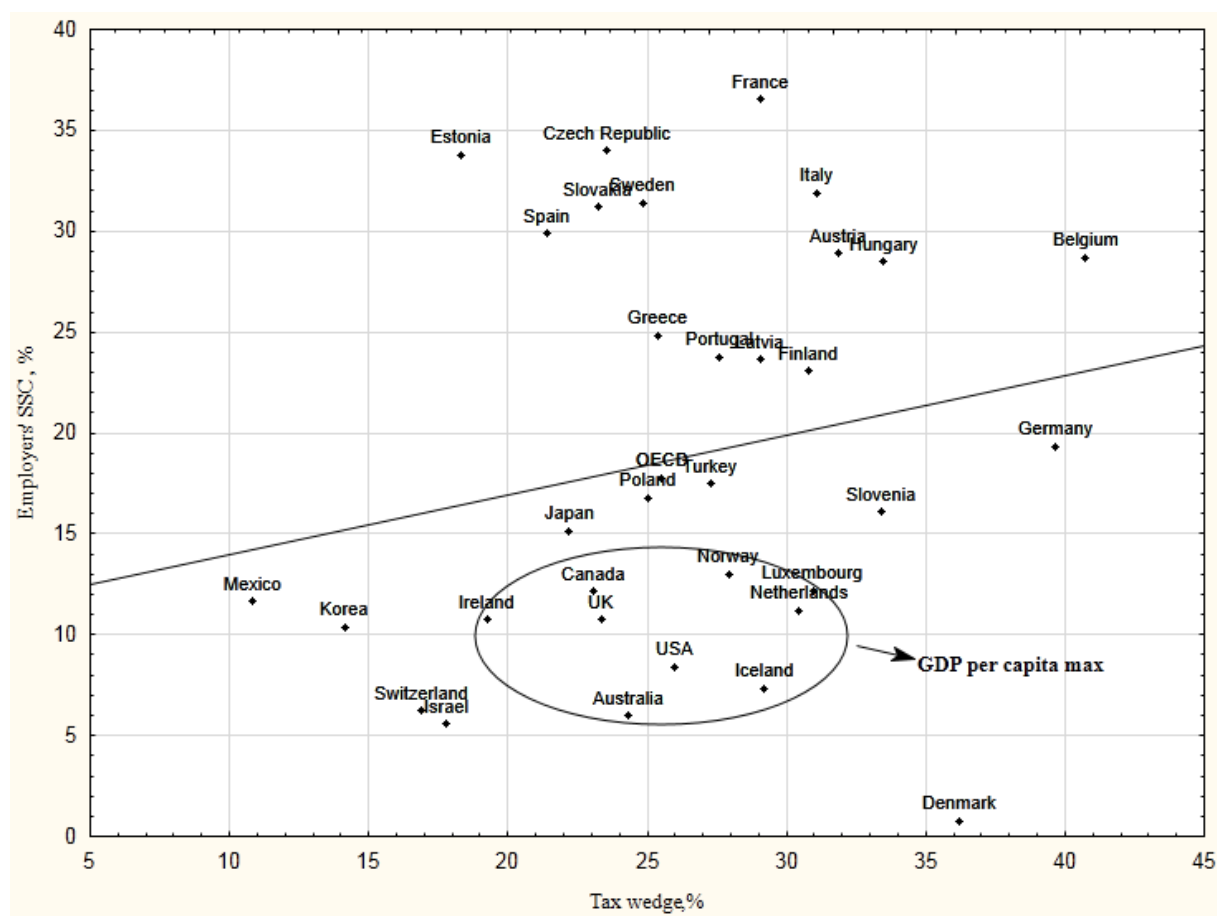
As one can see on Fig.1., during 2000-2016 there is no important change in both PIT rates and social security contributions rates in OECD countries. The insignificant reduction of indicators relates to the remedial actions to overcome 2008-2010 economic downturn.

According to the EC Report, the tax policy responses in the area of labor income taxation include:

- a temporary increase in transfers to the unemployed or low income households;
- a temporary lengthening of the duration of unemployment benefit;
- temporary reductions of the standard VAT rate;
- a reduction of social contributions paid by employers on low-skilled low-paid employees in order to promote their employability;
- the removal of the requirement for micro-enterprises to submit annual accounts [19].

Fig. 2. illustrates comparison between some indicators of labor income taxation in OECD countries.

Figure 2. Indicators of labor income taxation in OECD countries, 2016 (Source: author, based on [14]; [15]).



As one can see on Fig. 2, in 2016 the highest social security contributions rate, paid by employers, was in France, while the lowest – in Denmark and Israel. The maximum tax wedge was in Belgium and Germany, and the minimum was in Mexico and Korea.

However, the countries with highest GDP per capita (between OECD states) are grouped together at the bottom of Fig. 2. In terms of labor income taxation it could be evidence that in the richest OECD countries employees bear average tax burden with simultaneously low social security contributions rates paid by employers.

In general, the reforming of labor income taxation in most of OECD countries aimed not only to shift the tax burden on consumption, but also to reduce both the degree of progressivity of labor income taxes, and their marginal rates, especially, for higher tax brackets.

To estimate the level of progressivity of labor taxation in OECD countries we calculated the progressivity index of labor income taxation for OECD countries for 2016. We estimated the progressivity of tax wedge components: personal income tax, employers' and employees social security contributions.

For this, we used the following formula:

$$Progressivity\ of\ tax\ schedule = \frac{1}{N} \sum_{i=1}^N \left( \frac{METR_i}{AETR_i} \right) \quad (1) ,$$

where *METR* is the marginal tax rate;

*AETR* is the average tax rate, i.e. the share of tax burden in the taxpayer's gross labor income;

$N$  are levels of labor income (50%-250% of the average workers income);  $N = 201$ ,  $i = 1 \dots N$  [17].

Table 2. presents the results of calculation.

**Table 2. Progressivity index for the tax wedge and its components in OECD countries, 2016 (Source: author's calculations, based on [14]; [15]).**

Country	Employer's SSC	Employee's SSC	Personal income tax	Overall tax wedge
Austria	0,69	0,53	1,28	1,07
Belgium	1,03	1,13	1,39	1,23
Canada	0,55	0,32	1,45	1,24
Czech Republic	1	1	1,26	1,11
Estonia	1	1	1,25	1,08
Finland	1	1,02	1,47	1,27
France	1,18	0,90	1,33	1,20
Germany	0,44	0,43	1,15	1,03
Greece	1	1	1,52	1,28
Hungary	1	1	1	1
Ireland	1,03	0,997	2,16	1,64
Israel	1,27	1,42	1,85	1,69
Italy	1	1,04	1,49	1,23
Japan	0,74	0,72	1,25	1,10
Korea	0,79	0,73	1,49	1,25
Luxembourg	0,77	0,82	1,40	1,26
Mexico	0,72	1,16	3,36	1,33
Netherlands	0,29	0,52	1,49	1,32
Norway	1	1	1,35	1,24
Poland	1	1	1,14	1,08
Portugal	1	1	1,60	1,29
Slovakia	1,03	1,03	1,29	1,14
Slovenia	1	1	1,34	1,23
Spain	0,57	0,57	1,52	1,099
Sweden	1	0,31	1,52	1,27
Switzerland	0,97	0,97	1,48	1,36
Turkey	1	1	1,26	1,16
UK	1,21	0,64	1,45	1,35
USA	0,84	0,91	1,28	1,195
OECD average	0,93	0,89	1,37	1,22

The results allowed us to determine the following current trends in taxation of labor income in OECD countries:

- in most of OECD countries the schedule of social security contributions, paid by employer, is regressive (11 countries) or flat (12 countries);
- the schedule of social security contributions, paid by employee, in most OECD countries is regressive (14 countries) or flat (9 countries);
- the schedule of personal income tax is progressive in all OECD countries except Hungary, where this schedule is flat.

The Israeli labor income tax system is found to be the most progressive system overall (1,69) as well as social security contributions system – 1,27 for social security contributions, paid by employer, and 1,42 – for social security contributions, paid by employee. Mexico stands out with a very progressive schedule of personal income tax (3,36), exceeding 3 times the OECD average. At the same time, country has the 33<sup>rd</sup> lowest tax wedge among the 35 OECD members – the average single worker in Mexico faces a tax wedge of 20,1% compared with the OECD average of 36,0%. Ireland occupies the 2<sup>nd</sup> place on the level of progressivity of personal income tax – 2,16. For other OECD countries, the progressivity index for personal income tax falls within 1 and 2; the less progressive personal income tax schedules are in Poland (1,14) and Germany (1,15).

The less progressive systems of social security contributions are in Netherlands – 0,29 for social security contributions paid by employer and Sweden – 0,31 for social security contributions paid by employee. In general, OECD countries have regressive schedules of social security contributions paid by employer and employees – 0,93 and 0,89 respectively, while the schedule of personal income tax is progressive (1,37).

#### **4 Conclusion**

The developed countries worldwide are actively discussing two main direction of reforms of labor income taxation:

- the shifting of taxation from more mobile tax bases to the less mobile ones, notably, from taxation of income to taxation of consumption and/or property;

- the reduction of tax rates with simultaneous broadening of the tax base.

In general, according to the current tax theory, the switching from income to consumption taxes (with no impact on tax revenue), is intended to reduce the tax burden on labor in order to increase the employment and economic growth.

But in practice, the government's fiscal policy faces a number of challenges caused by openness of the economy, which means the lower mobility of labor income comparing with corporate income since workforce overall is less mobile than capital.

The mentioned problems relate, particularly, the possibilities of shifting of the corporate income tax burden onto labor. In terms of labor supply, the income tax is considered as distortive, because it discourage individuals' economic activity and leads to the reduction of number of working hours. However, consumption taxes have similar impact on labor supply, by reducing the real wage. Nevertheless, due to their broader tax base and their "proportionality" they are less distortive for achieving the same level of income (compared to labor income taxes).

When government is concerned about social equity and distribution purposes, such a reform should include the reduction of the tax rate at the same value for each tax bracket in order to maintain the progressivity of the tax system.

The empirical section includes analysis of indicators of labor income taxation in OECD countries. Notably the graphical analysis showed that in countries with highest GDP per capita, workers bear average labor tax burden (personal income tax plus employee's social security contributions) accompanied simultaneously by low employer' social security contributions rates. We calculated the progressivity index of labor income taxation for OECD countries for 2016; we estimated the overall tax wedge and its components: personal income tax, employer's and employee's social security contributions separately. For this we used the data for a basic household type – single person at 100% of average earnings (average workers wage), without children, provided by OECD statistics. The results enabled cross-country comparisons of progressivity of tax wedge and its components in OECD countries. In particular, our results showed that in most OECD countries the schedules of employers' and employees social security contributions are regressive or flat, while schedule of personal income tax rate is progressive in all countries, except Hungary with flat tax schedule.

The calculation and analysis of tax wedge using the time series data for OECD countries will allow to estimate the progressivity of schedules of labor income taxation in more detail, so that will be the topic for the future work.

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# Behavioural Economics and Public Finance: Case Studies

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## Abstract

The aim of this article is to raise awareness on behavioural economics and its applicability within public finance and to attract further discussion on the topic within the academic community (despite the topic already being popularized by the last Nobel Prize award winner in economics, R. Thaler, whose focus was the aforementioned behavioural economics). First part will present a genesis of behavioural economics and finance in relation to historical context. The consequent chapter will provide an overview of incentives and activities being performed around the world using behavioural ideas and concepts as building blocks for field experiments, further academic research and application in public services and finances. Last part of the text is devoted to case studies where the presented theory is applied in practice. Reader should obtain a comprehensive overview of current trends using findings of behavioural economics in public finance

*Keywords: behavioral economics; behavioral finance; nudge; public finance*

JEL Classification: D91, G41, H260

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## 1 Introduction

Behavioural economics and finance challenges the paradigm of an economic behaviour of humans, as contradictory to the proponents of neoclassical economics, as it does not perceive a human being as a robot designed for optimization of its needs based on a utility function. The theory integrates findings and knowledge of finance, psychology, sociology, and cognitive science.

Given the difficulties of measuring and quantifying impacts of these disciplines on the behaviour of economic subjects during the period of formation of classical and neo-classical economics, such theories have abstracted from influences of the above-mentioned variables on the decision making process of an agent. Therefore, economic models were built based on significantly simplified conditions and assumptions. Nevertheless, even Adam Smith in his well-known Theory of Moral Sentiment expressed thoughts that are distant from the findings in prospect theory: "Pain, I have already had occasion to observe, is, in almost all cases, a more pungent sensation than the opposite and correspondent pleasure" [11].

The aim of this article is to raise awareness on behavioural economics and its applicability within public finance and to attract further discussion on the topic within the academic community (despite the topic already being popularized by the last Nobel Prize award winner in economics, R. Thaler, whose focus was the aforementioned behavioural economics). Therefore, the main goal of the paper is to provide an analysis of current applications of behavioral economics in relation with public finance. Is it feasible to successfully apply findings of the theory on large-scale projects within public finance in current political and social environment? Would be such projects perceived as beneficial or it would have negative perception as a consequence of "libertarian paternalism" concept? Would such experiments met expectations? In the article, I try to address these questions.

First part will present a genesis of behavioural economics and finance in relation to historical context. The consequent chapter will provide an overview of incentives and activities being performed around the world using behavioural ideas and concepts as building blocks for field experiments, further academic research and application in public services and finances. Last part of the text is devoted to case studies where the presented theory is applied in practice.

Reader should obtain a comprehensive overview of current trends using findings of behavioural economics in public finance.

## 2 Material and Methods

The statutory retirement age plays the most striking role in the disability concept of old-age pensions, applied in a strict form in the original blue-collar social pension insurance. The old-age pension is understood “only” as a special case of disability pension: it was based on the presumption of disability of individuals from a given, statutory age. It applied also under the pre-war Czechoslovakia: “An old-age pension is just a disability pension, only it is not necessary to examine the disability.” A consistent disability pension concept also excludes overlapping pensions and earnings – if a pension beneficiary was not disabled and manifested it by a working activity, he/she automatically lost pension entitlement.

In this chapter, please provide the description of used methods, characteristics of data files, etc. If you stem from your previous work, describe it here shortly too.

As was already mentioned, first signs of application of behavioural ideas within academic work were presented in the Theory of Moral Sentiment published by Smith. The author introduced concepts that form the basis of today's behavioural economics and finance such as “overconfidence” or “loss aversion“. Nevertheless, following classical and neo-classical economic theories were built on rather mathematical calculations and methods that recognised human being as an agent who is able to make perfectly rational decisions with regard to maximization of their utility [1]. The theory of utility evolved into two diverse forms – based on the cardinal and ordinal approach. The first, presented and promoted by Alfred Marshall, was built on underlying assumption that the utility can be measured but the quantification of utility defined as subjective satisfaction is not objectively possible. For this reason, indirect measure of utility was made through the usage of money [7]. In contrast, the ordinal approach rejects any form of measurement utility, nevertheless, according to the theory, it allows for a qualitative ranking of utility. The proponent of this philosophy was Vilfredo Pareto who first pioneered the indifference curves in the 1906 Handbook of Political Economics and used the infamous term “homo oeconomicus” [9]. The basis of the traditional direction of economic theory is therefore a rational choice since if the consumer does not maximize his profit he does not behave rationally.

However, in many cases consumers do not pursue the maximization of their benefits and do so on a regular and a systematic basis. One example may be tipping in restaurants, as it does not provide any additional benefit to the agent. Even the theory of marginal utility, in which the decreasing benefit in saturation of satisfaction resulting from the use of additional units of the estate predict the reduction of consumption of the product and the change in the allocation of scarce resources is not able to reliably explain every behaviour of the consumer. In this case, it is possible to point out addictive substances which consumption could be constantly increasing.

### 2.1 St. Petersburg paradox

Daniel Bernoulli discovered the very first evidence about the shortcomings of the theory of marginal utility within the so-called St. Petersburg paradox. The aforementioned brilliant Swiss physicist and mathematician presented the following hypothetical game - the player purchases tickets for the Petrograd casino (hence the name of the paradox) for a certain amount, where a fair coin is tossed and the number of games equals the number of tickets. The game is played as long as the “head” lands, then the game is terminated and the player receives a win at  $2^n$  where “n” is the number of tosses. The resulting value is equal to infinity according to the following formula:

$$1 \frac{1}{2} + 2 \frac{1}{4} + 4 \frac{1}{8} + \dots + 2^n \frac{1}{2^{n+1}} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} \dots = \infty \quad (1)$$

Based on the aforementioned calculation, the purchase of any number of tickets should be profitable, nevertheless, such concept does not reflect the true behaviour of the consumer. The acceptability of very expensive tickets lies in the possibility of obtaining an unlimited or enormous prize that can only occur in a negligible number of cases. Bernoulli suggested that in order for consumers to not pay astronomical sums for participating in similar games, this function must be concave in shape, since additional wealth units have a decreasing benefit for consumers [10].

**2.2 Allais paradox**

Maurice Allais, the Nobel Laureate in economics, has in his scientific work published in 1953 first questioned the validity of the expected utility theory and has demonstrated that a rationally thinking consumer prefers a certain win over the maximum expected benefit.

**Table 1. Lottery system used in the experiment (Author based on [9])**

Potential win / probability within particular options	0	100	500
Option A	0%	100%	0%
Option B	1%	89%	10%

Most participants preferred option A over option B, this thus empirically confirmed the hypothesis that the certainty of the payoff in this case would be a stronger motivation for the individual than the expected [10].

**2.3 Prospect theory**

The concept of behavioural economics and finance has been in dynamic development since the 1970s, primarily based on the brilliant work of two cognitive psychologists: D. Kahneman and A. Tversky. Their academic work followed up the academic research of H. M. Markowitz who, despite being known as the author of modern theory of the portfolio, also contributed significantly to the foundations of behavioural economics. The American economist and Nobel Laureate in the Utility of Wealth responds to Friedman and Savage's Utility Analysis of Choices Involving Risk [4], seeing the differences between the theory and the real behaviour of people. In his academic work, Markowitz presents the idea of perceptions of gains and losses with respect to the reference point based on which he proposes a function with three inflection points [6].

In 1979, D. Kahneman and A. Tversky published an original prospect theory in which they criticized traditional finances based on the assumption that a human being, in high-risk situations, choses a risk-averse solution, and the utility is a concave function of income. The article presented several behavioural phenomena confirmed by their own empirical research. On the grounds of their experiments, a risk-averse behaviour was discovered in the case of the possibility of realizing profits (and to the contrary, a risk-seeking one in the case of a potential loss) [13]. In 1992, Tversky and Kahneman have presented a more advanced version of the original Prospect theory in the article "Advances in Prospective Theory: Cumulative Representation of Uncertainty", that works with five fundamental behavioural effects and concepts that have been confirmed by a number of experiments: framing, nonlinear preferences, source dependence, risk seeking and loss aversion [14].

Following section would be subject to analysis of current findings in behavioral economy within public finance. Selected projects and experiments of the most well known companies, institutions or research programs using knowledge of the theory will be presented. Selection criteria consist of relation to public finance, extent of using behavioral economy and its

topicality. Considering above-mentioned aspects there are only several projects that are relevant.

### 3 Results and Discussion

The milestone in the perception of applicability of behavioural economics in public finance was a book "Nudge: Improving Decisions on Health, Wealth, and Happiness" published in 2008 by Richard H. Thaler and Cass R. Sunstein. The main idea of the publication is a "nudge" which can be formulated as a slight change in the design of options or environments that can significantly affect the behaviour of a large target group. This idea has been demonstrated by a fictional cafeteria manager who can influence choices of a significant number of students through the different placement of food in school canteens. Thaler and Sunstein have invented the idea of a "choice architect" - an individual who is responsible for preparing / organizing / adapting the environment in which people are making decisions. Obviously, such an environment can be driven to the benefit and to the detriment of those who are affected by it. The authors also introduce a new term "libertarian paternalism" freely translated as liberal paternalism. According to Thaler and Sunstein, the design of public policies should show signs of paternalism in order to improve the health, the length and the quality of life of people, while simultaneously preserving the choice, thus avoiding the restriction of individuals who want to go their own way. The above concept is based on three key ideas [12]:

- The design and architecture of choices greatly affects decisions of the target group;
- It is not possible to avoid the construction of options (e.g. in the school canteen from this the food has to be arranged in one way or another) and there is the question why not to use this possibility and not try improving the benefit and welfare of the individual and
- Liberal paternalism is not an oxymoron because such behaviour may put some possibility into a better position with respect to the context, but it does not prevent freedom of choice.

United States President Barack Obama later appointed Cass R. Sunstein as Head of the Office of Information and Regulatory Affairs. Sunstein is a professor at Harvard University and the most cited professor of law in the United States of America. Richard Thaler, a professor of behavioural economics and finance at the University of Chicago and Nobel Prize winner in 2017, has become an adviser to the Behavioural Insight Team (also referred to as "BIT"), which was formed in 2010 by British Prime Minister James Cameron and bears the nickname "nudge unit".

#### 3.1 Office of Information and Regulatory Affairs (United States)

The Office carries out its activities within the Executive Office of the President. The primary function is to review federal regulations to avoid inconsistency, incompatibility and duplication of government policies. Institutions also review retrospective regulatory measures already in place, thereby supporting the effectiveness of the regulatory system.

#### 3.2 Behavioural Insight Team (United Kingdom)

BIT is the first work group of its kind in the world focused solely on the application of knowledge from behavioural sciences. Nudge unit vision is to support organizations and institutions in the UK and abroad in applying behavioural science in socially beneficial projects. Its staff, the UK government and Nesta, a leading UK charity focused on innovative projects, own the team. The goal of BIT is to provide a simple, cost-effective solution delivering significant results. Several of the many proposed and implemented Behavioural Insight Team interventions over the last few years will be analysed later in the article.

### 3.3 *ideas42 (Harvard University)*

Ideas 42 commenced its activity as a small project at Harvard University in 2008 claiming to be first behavioural lab in the world. Nowadays the organization represents a non-profit consulting firm with offices in several United States cities and is involved in projects focused on application of behavioural sciences around the world. Ideas42 tackles primarily social problems within following areas: consumer finance, education, economic opportunity, energy consumption and environmental conservation, healthcare, and criminal justice.

### 3.4 *Mind, Behavior, and Development Unit “eMBeD” (The World Bank)*

The eMBeD is the behavioural science unit at the World Bank supporting governments across the globe in the implementation of behavioural insights in policy making activities or establishing their own behavioural units. The unit works closely with governments, dedicated project teams and partners, in application of behavioural based interventions. Recent project focused on tax compliance in Poland will be discussed later in the article.

Following text is devoted to recent case studies where behavioural findings and concepts are applied in practice with remarkable results.

### 3.5 *Case Study: Automatic enrolment to workplace pension scheme in UK, Behavioural Insight Team (2012 - 2015)*

The default option was shifted from an opt-in to an opt-out scheme in large companies (around 58,000 of legal entities, by the end of the assess period 99% were compliant with the regulation) as a consequence, the enrolment rate increased substantially from 55 % to 70 % within the assessed period of 2012 to 2015. In absolute numbers, 5.4 million people were automatically enrolled and at the same time only 8% to 14% exercised the right to opt-out (initial assumption was 28%).

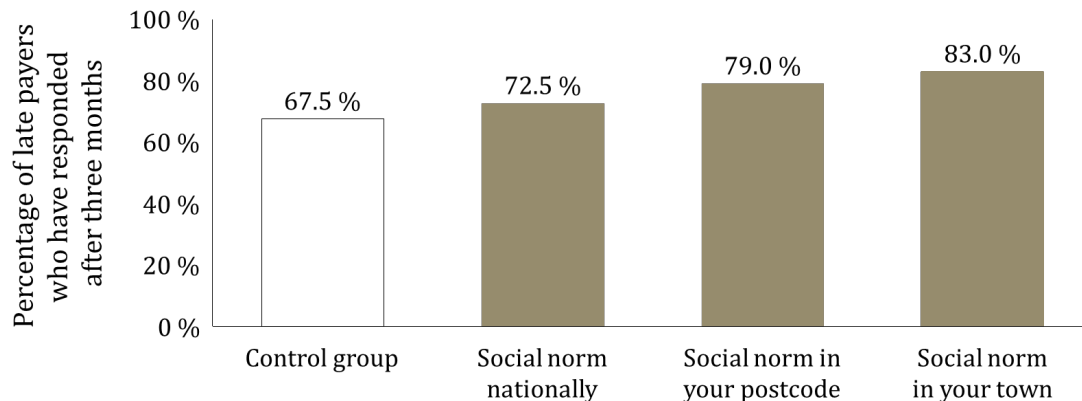
Slight behavioural “nudge” adverse previous negative trend from public policies perspective as the proportion of eligible workers participating in workplace pension schemes fell from 63% in 2004 to 55% in 2012. Due to the great success of the policy, smaller employers are required to enrol their workers to the pension scheme as well (by 2018) [8].

### 3.6 *Case Study: Tax Collection in UK, Behavioural Insight Team (2012)*

Behavioural sciences to tax collection in the UK. HM Revenue and Customs (HMRC) is a tax office that has reached up to 70% of its success in collecting late payments through letter-based reminders prior to the experiment. This form of communication is ideal for the institution because the cost of letters is relatively low and the office is required to contact a large number of individuals. This has resulted in HMRC's efforts to maximize the effectiveness of the "letter solution“, and cooperation with the BIT has begun in order to assess how effectively the so-called social norms (based behavioural concepts) can contribute to speeding up the payment of taxes.

The experiment was carried out on 140,000 taxpayers who received either a control letter or letter that included behavioural elements. All of the social norm letters included the following statement: "9 out of 10 British pay their taxes properly and on time," some of them said that most people around the recipient had already paid it. Implementing social norms into letters have produced impressive results (Figure 1).

**Figure 1. Using social norms to increase tax debt payments [2]**



According to HMRC's analysis, over 160 million pounds would be collected across the UK in case of the implementation of the solution during assessed period, generating a contribution of up to 30 million pounds annually (through cost savings on debt recovery and improving the cash flow of the institution) [2].

### 3.7 Case Study: Tax Collection in Poland, Mind, Behavior, and Development Unit (2017)

Based on the positive feedback from the aforementioned project, similar experiment was conducted in Poland, which is culturally and geographically relatively close to the Czech Republic. The pilot project was implemented at a similar number of respondents as in the UK, as 149 925 addressees received the control letter and its modifications using the behavioural elements. This experiment aimed to test not only the individual texts but also the form of letter delivery.

The results show that all letters with behavioural elements were more effective compared to the standard form of communication (control letter). Key findings from the experiment include that the effect of a standard behavioural form of communication was greater than in the case of letters with the addition of less vigorous behavioural elements, however this can be influenced by a specific Polish environment and mind-set. At the same time letters containing more "aggressive" elements, emphasizing the negative consequences of deliberate conduct that would be contrary to proper tax, increased tax compliance by 20.8%. Implementing of the best performing solution would increase tax revenues by 56% within the trial group. When analysing the form of letter delivery (common versus registered), there was no statistically significant difference in responders' response [5].

### 3.8 Case Study: Tax declaration submission in Mexico, Behavioural Insight Team (2016)

In 2016, Behavioural Insight Team conducted a trial involving 748,499 taxpaying businesses in Mexico. The aim of the experiment was to "nudge" businesses to declare their revenues on time by behavioural intervention. Participants received SMS messages in case they failed to submit their declaration a fortnight before the deadline. As in the previous case from Poland, the most successful form of behavioural message embraced elements that stressed negative outcomes such as potential fines for non-compliance. The result of the most efficient way of wording and frequency of delivering the messages increased declaration rates from 24% to 33%. That represents a return on investment of 400% (increased revenues compared to the cost of SMS) [3].

## 4 Conclusion

The main goal of the paper was to provide an analysis of current applications of behavioral economics in relation with public finance. For this purpose, there were presented current findings of the theory within public finance and selected relevant case studies, some of them with significant sample groups. Based on those, it has been demonstrated that by slightly modifying existing conditions (e.g. wording), the behaviour of the target population can be positively influenced from the perspective of the public finance without restricting free choice of the target group, negative public perception as a consequence of “libertarian paternalism” concept or significant additional costs. For example, reminder letters of unpaid tax are sent with a certain formulation, regardless of whether they contain the aforementioned behavioural interventions or not.

On the contrary, it is important to stress that there were prepared, executed, completed and publicly presented only several such projects. However, as was presented within selected case studies, using knowledge and findings of behavioural knowledge can bring relatively simple solutions using existing system elements with significant outcomes. Moreover, it is also necessary to bear in mind that modification of public policies can be challenging in terms of the legislation process and time consuming with uncertain results, which may explain willingness of the decision makers for such experiments.

In my opinion, we are facing the application of psychology in order to influence our decision-making process on a daily basis by vast number of advertising messages and marketing activities - let us imagine how appealing such communications would be for us if they would present just the name of the producer and the phrase "You have to buy it". Unfortunately, that is exactly how most of the official communication of the state institution is currently structured. On the other hand, application of knowledge from behavioural economics does not require legislative or regulatory changes, while simultaneously is able of significantly increasing public welfare using only the existing system environment and its elements.

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# Analysis of the Process of Controlling Implementation in the Ministry of Defense of the Czech Republic

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## Abstract

The aim of the article is to evaluate the current state of controlling implementation process within the Ministry of Defense of the Czech Republic (MoD CR). From 2014, when controlling was selected as the official management tool of cost control, and 2017, when it was put into practice, every cost unit is obliged to participate in data collection that should serve for evaluation of economy and effectiveness of MoD CR internal units. In this article, we identify benefits of a widespread controlling implementation, its strengths and weaknesses, and we also deal with existing unsuccessful subprojects in controlling implementation process. The analysis exploits scientific articles, relating legal regulations and primarily MoD CR databases included in the Financial Information System MoD CR (FIS) which besides other serves as a data cube to collect information from all cost centers. For the article purposes we selected data of one particular MoD CR cost center.

*Keywords: costs; cost allocation; controlling; ministry of defense*

JEL Classification: H83, H71, H72

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## 1 Introduction

Change in accounting methodology of the public sector that occurred in developed countries within the last decades of the 20<sup>th</sup> century and the first decade of the 21<sup>st</sup> century represented a transfer from the cash basis of accounting to the accrual one. Possible advantages of the accrual methodology in the area of the public sector were described for example by Pina and Torres [13] and besides other it should enable to monitor the total costs of the public sector activities, to create environment for business-like methods utilization and finally to increase the efficiency of the public sector. Development of the implementation process in European countries was traced for example by Lüder and Jones [6] who supported the process also methodically. The Czech Republic, similarly as other European countries has implemented the accrual basis to the public sector methodology till 2010. Also the MoD CR went through this process when in 2011 the first financial statements prepared under the accrual basis were released for MoD CR as a whole [18].

In the world meanwhile attempts to implement business-like methods to the public sector management were recorded. We may trace experience mainly from the local government (but sometimes also from the state government) describing utilization of cost accounting, reporting, benchmarking or other managerial tools while managing of various public sector units. Though some authors advocate benefits of managerial methods implementation – for example [14] or [5], more others point out that real efficiency or performance improvement is rather unproven [12], [17] or [15]. Also opinions on probable reasons of this situation differ among experts. Some of them ascribe it to business tools unsuitability for the area of the public sector – closely see [3], majority of them attributes it to improper or inconsistent implementation of business tools [12], [16], [4] and some point out of course political reasons [1]. However it is evident that a system of financial accounting preparing financial statements under the accrual basis of accounting unit as a whole should be definitely supplemented by any proper managerial tool to monitor total costs

of its partial subunits. In opposite case it will not be possible to evaluate expenses or performance of these subunits or partial activities. Especially in the case of big subjects with complicated organizational structure and high requirements for financial sources, such as the state administration units, evaluation and mutual comparison of their internal components would be beneficial.

That is why we concentrate on controlling implementation process in MoD CR and its present development in relation to managerial requirement. Analysis of the current state of controlling implementation process is loosely based on our former research that we presented in previous two years [18], [19] and we examine possible progress in controlling implementation.

Decision to implement controlling as an official managerial tool comes from 2013 when MoD CR has authorized a new economic conception with this intention [9]. The idea of controlling implementation however was not entirely new in the area of the Czech state administration. Similarly at the same time the Ministry of Finance of the Czech Republic has presented several so called key analytical performance indicators [8] and organized seminars for their utilization within controlling process. So other ministries, such as Ministry of Interior has decided to implement controlling criteria consequently. But still it can be concluded that the idea of controlling criteria utilization is closer rather to the local than the state administration.

System of MoD CR controlling comes from financial accounting data and their modification and completion through a system of managerial accounts. Managerial accounting generally belongs to the proved tools of possible managerial control not only for businesses but also for the public sector utilization; see for example [2] or [7]. In 2014 a pilot project of controlling implementation in selected cost units of MoD CR was launched and from 2017 controlling system was put into practice across all MoD CR units officially. The whole MoD unit was internally divided into partial cost centers with further internal divisions and all these subunits are now required to monitor and record cost data in modules created for purposes of controlling within FIS [10], [11]. Thanks to this departmental implementation we can monitor the first relevant outputs and try to evaluate the strengths and weaknesses of this project. So, where has been moved the project last year, what does it bring to users, and how its vision is? In this article we try to find answers to these questions.

## **2 Material and Methods**

As it was stated before in our paper we examine the real state of controlling implementation process within MoD CR and summarize its benefits and shortages. We compare present findings with our previous knowledge published in last two years to find out any progress.

As main data sources we used scientific papers, relating legal regulations and internal MoD CR directives in the paper. In the case of practical analysis we come from internal MoD CR databases contained in MoD CR FIS (financial information system) and its partial software modules, i.e. RON (cost allocation database), and electronic controlling journals. All software modules are created individually according to MoD CR requirements by Czech provider. Own cost allocation process is organized in several steps (as we described in our previous research [18], [19]). The first one represents posting expenses and revenue data from financial accounting database to controlling journals. Besides financial accounting data, a special module called RON (Cost allocation) and DFF CNT (Data controlling cube) are used. The aim of the step is to allocate as much costs as possible to relevant cost unit. In next three steps further costs are allocated via assigned bases. It concerns energies and other services purchased centrally.

Used scientific methods encompass bibliographic search of relevant literary sources concerning accrual methodology implementation to the public sector, managerial accounting and managerial methods utilization. Further for purposes of chapter 3 we used description of existing controlling system, its analysis, comparison with former situation, and synthesis of

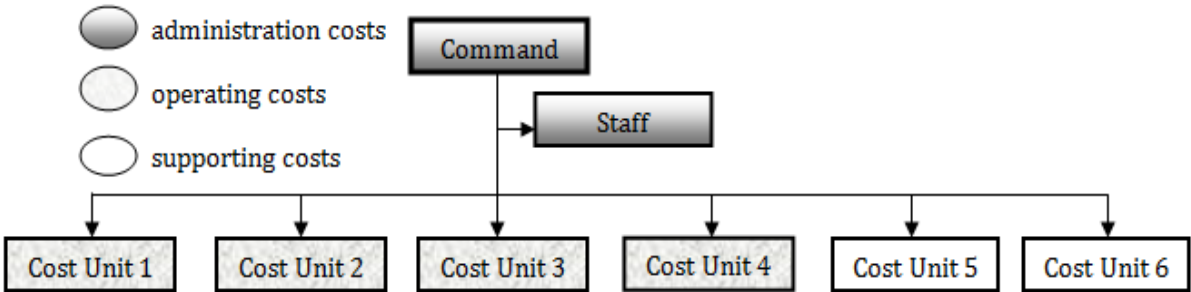
knowledge. To verify main findings, we used conducted interviews with economic managers of 6 examined cost subunits. In future we plan to enlarge a respondent sample and supplement interviews by anonymous questionnaire survey.

As main limiting condition we determined to reduce our practical analysis to one state administration unit only, specifically MoD CR. This ministry belongs to those that dispose of the highest amount of sources. Moreover, our former research was partly carried out within this ministry and we have relevant internal data at disposal. In the term of the ministry we further limited our practical research to one particular cost unit. Information capability of our findings may be of course limited and for more relevant conclusion would be desired to analyse other components of the state administration too. Even so we believe that the situation concerning costs management is very similar across the state administration units and so some our findings may have common character.

As it was stated before, practical analysis of internal costs was carried out within a selected cost unit (rapid deployment brigade) that was chosen due to its involving to former pilot project of controlling implementation so we can compare its progress now. Cost units of the MoD may have various character and carry out diverse activities. They encompass combat battalions, air bases, logistic regiments, logistic security regiments, special forces, general staff, and others. Various unit activities imply naturally different requirements of sources and recorded costs. Our selected cost unit encompasses 6 organizational components, i.e. sub-units or cost units of the 2<sup>nd</sup> level, command and staff as figure 1 implies.

Command and staff provide the whole cost unit with management and administrative activities and so record mostly administrative costs. 4 cost units of the 2<sup>nd</sup> level ensure combat (operating) activities as firing, tactic, topographic or driving training, 2 supporting units carry out activities as maintenance of the long-term assets logistic support and so on. The model is partly simplified for our analytical purposes.

Figure 1. Simplified structure of selected cost unit (Source: Authors)



**3 Results and Discussion**

Thanks to proceeding controlling implementation MoD CR is able to monitor and evaluate a whole range of cross-sectional data at present. Primarily, it is possible (though still not absolutely exactly) to determine cost needs of each cost center. The project, as mentioned above, involves all cost centers across MoD CR including those which dispose of and manage the major part of financial resources determined to expenditures, i.e. acquisition centers. There exists a current trend in acquisition process, when MoD CR is trying to centralize procurement maximally. If we do not utilize controlling, we would not be able to track all these costs of purchased assets and services within cost units that really have consumed them. These costs would be allocated to acquisition centers that only purchase but not utilize them. And from management and planning point of view, it is completely insufficient idea. The need to know accountability for incurrence of costs is the basic premise to achieve an effective management.

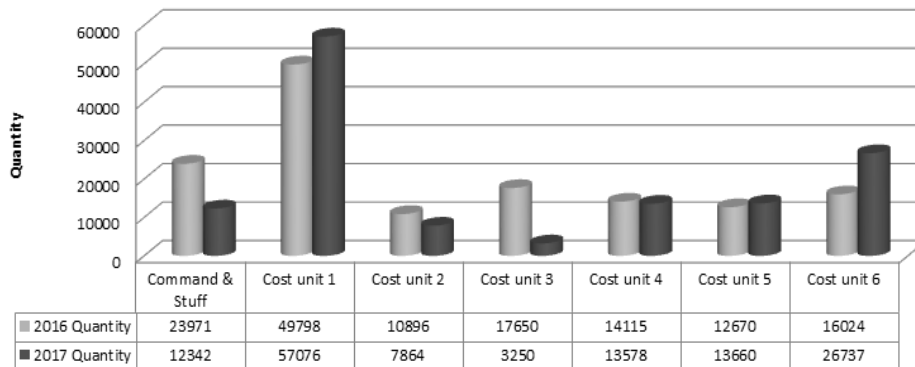
Clear and specific identification of the place of their origin, helps to allocate all costs incurred where they really belong. Controlling as a managerial tool hides a wealth of possibilities and opportunities to rationalize and optimize the sources management of any organization.

It can be further stated that controlling is not only about cost monitoring in MoD CR. It is a comprehensive managerial method that can make management more efficient. Being able to monitor and evaluate costs is crucial for effective management, but controlling can also track other non-less interesting and important indicators, so-called non-financial indicators. As an example personal or property data may be mentioned. So a manager of particular cost unit may monitor for example staff occupancy development or age structure of property.

Till 2016, MoD CR had been able to allocate limited range of costs directly to particular cost units, i.e. depreciations of fixed assets, consumed services, material and personnel costs [19]. However, these items were not the only costs incurred by cost centers; the others have not been registered initially. As an example we can mention small-sized fixed assets and their consumption. Initially, only depreciations of over-limit fixed assets were monitored by cost units, in 2017 the database has been extended by small-sized fixed assets. Accounting the fact they represent totally about CZK 0.5 billion, it is evident that information capability of the long-term assets data has improved significantly. Depreciations of small-sized fixed assets are recorded and allocated to all partial cost units. In comparison with over-limit fixed assets their depreciation proceeds en bloc, so they may increase expenses of cost units considerably. Omitting of small-sized fixed assets allocation and their depreciations result in cost misallocation. Formerly these costs were allocated to acquisition centers instead of real users, respectively the subsequent beneficiary of the small-sized fixed assets. But these centers were not responsible for the origin of these costs. So their allocation is very important for decision-making about the reproduction of these assets or for determining the real expenses of the MoD's organizational units. Newly introduced functionalities in controlling journals solve this misallocation of costs and allow users to track small-sized fixed assets through all their lifespan.

Analysis of the current state of cost monitoring and evaluation further proved working linkage between various MoD CR internal databases which may serve to better efficiency evaluation and control. For example in the case of material supplies consumption thanks to the data cube and functionality of controlling journals, a manager can now filter out what each individual cost has been spent on. The data cube is a part of the financial information system (FIS) and it is interconnected to the logistics information system (ISL), which records all MoD CR assets under the given catalog number and other attributes. So each consumption of material supplies is linked to the number of the cost unit to which the asset has been issued and recorded to the data cube. These data can then be simply filtered out from the data cube in accordance with the specified parameters (price, unit price, quantity). So a manager can track not only total cost, but also the number of pieces, liters, etc. As we deal with the field of defense, we chose the consumption of the selected type of ammunition. Following figure 2 shows how much ammunition was used by particular cost units within our selected cost center between 2016 and 2017. This figure may be more important from the point of view of commander than, let's say, ammunition costs. Manager (or commander) can then assess how single units train each month, compare the level of soldiers' training, to use data for better planning and etc. On the other hand, top management or economic manager will be interested in what the unit consumption in financial units is, how much ammunition was fired in a particular month and if there is no intentional consumption of ammunition especially at the end of the year.

**Figure 2. Consumption of ammunition NB 5,56x45 (Source: Authors, using MoD data from FIS, 2017)**



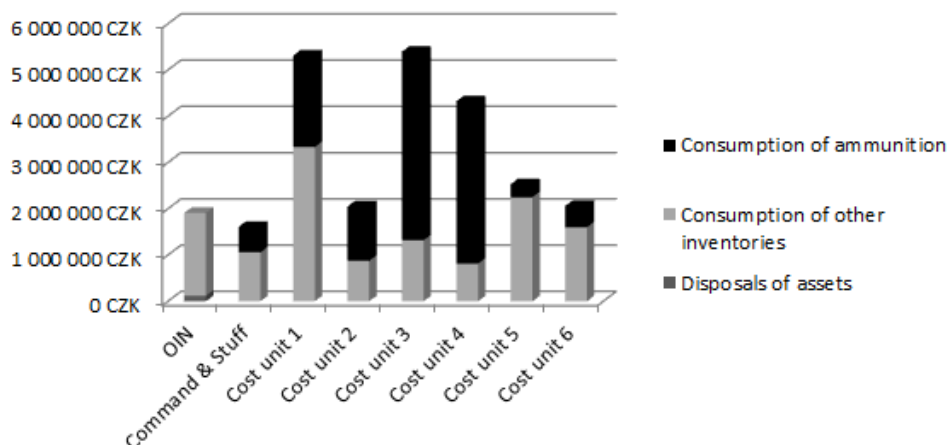
Thanks to interconnection of data cube and ISL, users can track the consumption of any item of material inventory by catalog numbers. It is possible to filter out the consumption of fuel, office supplies, medical supplies, etc.

Total inventories of the selected cost unit have reached CZK 1,256 billion in 2016 and also in terms of costs, they represents an important share. For deeper analysis of inventories consumption MoD CR has decided to monitor several so called types of movements. Controlling journals distinguish five types of inventories movements at present (in brackets shares of movements within examined cost units):

- regular consumption of inventories except for ammunition (ca. 46 % of costs);
- disposal of inventories for unusability and irreparability (ca. 21 % of costs);
- regular consumption of ammunition, i.e. during shooting (ca. 18 % of costs);
- inventories excluded from accounting records (ca. 12 % of costs);
- natural losses of inventories, i.e. to standard (ca. 3 % of costs).

Through selected controlling functionalities, accounting entries are projected into the data cube, from which data can be simply filtered out again. As you can see, the figure 3 below shows 3 most important inventories movements at the selected cost center. It can be seen from the figure that costs of ammunition consumption are significantly higher in cost units 1-4 (combat units), whereas material inventories consumption costs are relatively higher for Cost units 5-6 (supporting units) and command & stuff unit. Costs of disposal in the case of unnecessary assets are meanwhile allocated to other indirect costs (OIN). During next phases of the controlling process they are allocated to cost units according to the selected base ratio, compare [17], [18].

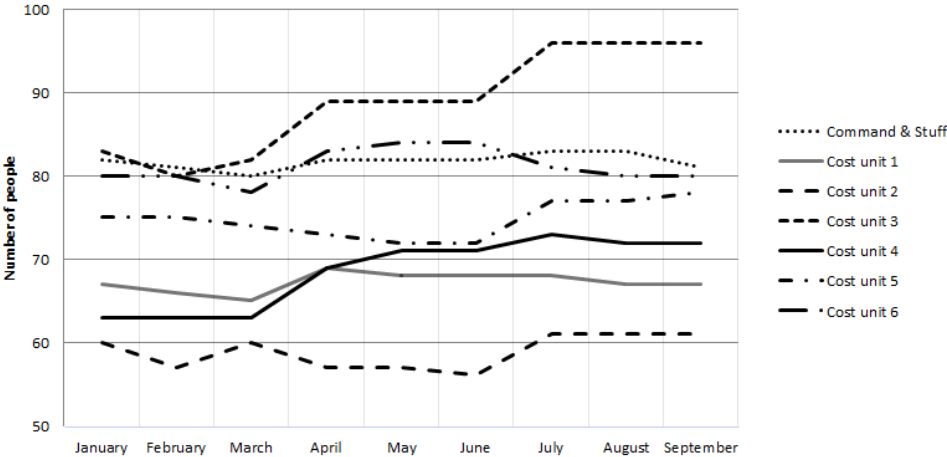
**Figure 3. Consumption of inventories in 2016 (Source: Authors, using MoD data from FIS, 2017)**



Presented data may be used by top management to evaluate why inventories were consumed and in what value. Based on this analysis, types of inventories and reasons for their consumption can be further analyzed (for example significant data may represent repairs of movable assets or fuel consumption), which can lead to better planning of central acquisitions and asset replacement.

As mentioned above, controlling may be used not only for cost tracking, but also as a complex managerial method for effective organization management. In our opinion, a significant shift to this direction was the introduction of a new functionality, so-called staff journal. This functionality serves primarily to HR departments and allows track the entire range of data that can be used for more efficient management of staff. By linking data cube and the Information system on service and personnel, MoD CR can assess the state and evolution of staff occupancy over time. Managers can also track the number of people on maternity or parental leave, number of people out of service for various reasons, types of labor relations (civil servants, professional soldiers, state employees), staff occupancy at particular cost centers in time, fluctuation of persons, etc. The figure 4 shows the development of staffing within selected cost center in 2017 (by September). If we monitor this indicator on a departmental scale, we will get a clear overview of the success or failure to meet the basic goal of the HR department, to achieve the fulfillment by the determined number of professional soldiers, respectively civil (state) employees. These outputs can undoubtedly contribute to more effective management and evaluation of compliance by personnel in MoD.

**Figure 4. Staff occupancy development (Source: Authors, using MoD data from FIS, 2017)**



#### 4 Conclusion

Analysis of the current situation in controlling implementation shows that continuing enlarging of controlling functionalities has a positive effect on the level and quality of monitored data. As well as interconnection of various MoD CR databases and the ability to monitor also non-financial indicators may strengthen managerial status. If we should summarize temporary benefits of controlling for MoD CR management we could recapitulate:

- Controlling provides a wide database utilizable not only for ex post cost control but also for planning and budgeting.
- Cost tracking enables identify clearly specific responsibility for resource consumption.
- Controlling data creates pressure to accept economically correct decisions.
- Interconnection of controlling and other managerial methods (for example benchmarking), offers possibilities of savings.

- Controlling may provide strong arguments for defending of budget needs.
- Controlling increases the employees' economic literacy.

Accounting the above-mentioned partial benefits, it seems that MoD CR continues systematically with the aim to achieve the basic goal of the whole project, i.e. to identify total expenses of cost units. On their basis, then to plan total expenses of cost centers or cost units. It means to create a cost plan that will serve as a basis for budgeting. As figures 2, 3 and 4 imply in the case of examined cost unit we can monitor development of selected financial and non-financial indicator in time (material consumption, ammunition consumption, staff occupancy). For example we can deeply analyze relatively high share of disposed inventories for unusability and irreparability (21 %), its reasons or possible renovation. Monitoring of non-financial criteria such as staff occupancy may help to obeying NATO criteria, recruit or personal cost planning.

Other practical possibilities of controlling data utilization may be monitoring of business travels, when MoD CR should be able to relate costs to a particular person, share and work with this data for other purposes. Next area of development could include, in particular, non-financial indicators such as the improvement of the scheduling bases for the distribution of centrally-charged costs (energy, repair of immovable infrastructure, etc.), the number and price of flight / moto hours (including pilot / driver / fuel costs, etc.), price and hours of specific training (including soldier's salary, equipment, maintenance of training areas, consumed material, transportation costs, etc.), as well as the exact cost of property maintaining, operating costs, and property repairs, etc. It could improve planning of central acquisitions and replacement of assets.

According to our findings MoD CR suspended some controlling subprojects. It concerns collection of some non-financial indicators (number of immobile vehicles, numbers of injuries, disciplinary and other punishments, etc.). It was found that these subprojects would be time-consuming with relatively low information capability. In our opinion at least an evidence of immobile vehicles could be beneficial.

On the other hand we can identify also some drawbacks of controlling implementation project. Primarily, it is an absence of online data even if they would be beneficial especially for operative decision-making. The reason of this state is rather technical. Anyway data processing is possible only after the financial statements in the given month due to regular month-end closing procedure in accounting process and managers must take it into a consideration. But in our opinion this technical barrier should not be so important obstacle within the whole decision-making process.

Much more serious problem in our opinion is that the project still faces a little interest from the side of MoD CR managers and commanders. Especially middle and lower management is not so willing to create and use controlling data within decision-making process. As our findings from conducted interviews imply managers ascertain the project as time-consuming, too administrative, and mainly non-motivating. They also proclaim they are overburden by various data collecting duties with no practical impact. They also argue by too high level of centralization and low scope for individual decision-making. So in our opinion it would be desirable to explain better advantages and possibilities of controlling to managers and commanders especially on middle and lower level of management. We also recommend consider a scope of controlling data that should be traced by middle and lower management in relation to their decision-making authority. Monitoring of too large controlling database would be probably disserviceable in this case. Finally, as very important we regard to set up any effective system of incentives in the case of meeting main controlling criteria. However this question is not discussed much so far.

To conclude our paper we would like to add that information capability of interviews may be limited because of relatively low number of respondents. That is why we plan in the terms of our research to organize a larger scale survey among middle and lower management of MoD CR by the way of conducted interviews and anonymous questionnaires.

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# Technical Pension and Tax Reforms for Czechia

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## Abstract

The Expert Committee on Pension Reform (2014-2017) did no comprehensive analysis of the Czech pension system and did not discuss any comprehensive pension reform. Just before the last meeting of this Committee the opinions were expressed that no pension reform is necessary – after the cancellation of the fully unsuccessful new retirement savings pillar and after some marginal parametric changes of the public and personal pensions. Although domestic and foreign recommendations are enough in this direction. The paper demonstrates that the 2010 ruling of the Czech Constitutional Court was not implemented duly by the then government: the system of public pensions continues to be unconstitutional and incomprehensible for its addressees. Moreover, the system of private pensions and pension savings is also unconstitutional and insufficiently comprehensible. The paper presents a systemic analysis of the public “pension insurance” and supplementary pension savings products and indicates potential alternatives of both these systems which would not, if possible, change the amounts of assessed pensions and of state support and which would result in their constitutionality and comprehensibility. The expected consequence of such a technical reform is a strongly increase of the rationality of the behaviour of the current and potential participants of these systems. At the same time a technical reform of wage taxation may be implemented.

*Keywords: pension reform; tax reform; personal income tax; social security contributions; healthcare financing*

JEL Classification: H55, H24, I13

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## 1 Introduction

The Czech “pension insurance” represents a mix of social insurance and flat-rate pension with a clear predominance of flat-rate pension. It appears as if it was funded by pension insurance premium paid by employers (21.5%) and employees (6.5% of wages); however, it is a “pension tax” paid to the state budget. No one even tries to explain the reasons for its existence, not to mention the meaningful distribution of insurance premiums between employers and employees. At the same time, the Ministry of Finance has been preparing a rationalization of the personal income tax for a long time - and it probably does not consider the existence of premiums for pension and other insurance.

Considerable attention is also not paid to health insurance premiums, which are from two-thirds paid by the employer and are not linked to the healthcare system. In fact, we have a system of “national health service”, complicated by the existence of 7 health insurers, which themselves collect insurance premiums to put them in a common pot for a 100% redistribution according to the number and composition of their clients. The state still contributes to this “redistribution” by noticeably low premiums for the “state insureds”. Insurance premiums paid by employers and employees are a multiple of the employee healthcare expenditure. It is just a big “game” for general health insurance premiums. The fierce political struggle is waged over a global state subsidy, which is hidden under the heading of the “premium for the state insureds”.

Modern pension theory requires strict separation of a solidary public pension pillar from the social pension insurance pillar (if it exists in the given country). From this it immediately ensues for Czechia the need and the necessity to divide the existing “pension insurance” into a solidary pillar and the real social pension insurance. The only “remaining” question is what

specific products to choose from. In general, there are three basic options for both “new” pension pillars.

The role of the solidary pillar can be fulfilled by

- flat-rate pension, or
- minimum pension, or
- raising the insurance pension to a minimum threshold, with this supplement decreasing e.g. by a 30% increase in the insurance pension (IP) – the resulting “guarantee pension” (GP) will then be calculated according to the formula:  $GP = 5,000 - 0.3 * IP$ , where 5,000 (CZK) is the minimum pension amount.

The role of the public insurance pension pillar can be played by 3 products:

- classical defined benefit (DB) social insurance scheme (where the pension formula is, for example, as follows:  $1.5\% * \text{number of years of insurance} * \text{average lifetime earnings}$ ); or
- modern system of defined contribution scheme of social pension insurance (NDC), or
- point scheme, where for each year of insurance the client receives a fraction, in which his earnings in a given year are in the numerator and the national average earnings (NAE) in that year are in the denominator.

The World Bank expertise for Czechia recommended in 2003 to transit to the NDC system, which consists in storing the paid pension insurance premiums on the client’s personal savings account with the state pension institution, and in valorising these funds, whereas after reaching retirement age the account converts into a lifetime pension under the actuarial rules [6]. In a slightly expanded form, this expertise was published in a World Bank publication [7]. As a solidary pillar, two options were recommended to us: a flat-rate or a minimum pension. An automatic consequence of this reform is a reduction of the pension insurance premium rate.

This contribution focuses on the endogenous factors of pension and related reforms, which are to eliminate the inefficiencies of the internal, mutual relationships of these social programmes. We ensure from the current system of redistribution; we do not aim to increase or reduce benefits. There are no ideal pension schemes but there are reforms that have shown to be beneficial to the sustainability and distributive impartiality of these schemes and should be applied to suit the economic dynamism of the respective country [8]. For the sake of simplification, these reforms are referred to as “technical” reforms.

The aim of this contribution is to formulate a technical pension reform, interconnected with the envisaged reform of the income tax and reveal other (possible) related reforms that would significantly simplify and streamline the Czech social system; everything, if possible, in the shortest possible term by the Ministry of Finance considered reform of the income tax, i.e. from 2020. Even in the possibly extended period we are not trying to implement a neo-liberal pension reform aimed at privatization of social pension insurance. The same is true for the Christian-Democratic paradigmatic reform, which would in turn point to a significant emphasis on the social pension insurance and solidary pillar would be reduced to a social assistance for pensioners (as e.g. in Germany). We operate, however, in the context of the modern liberal welfare regime and the social-democratic welfare regime, sometimes referred to as the social-liberal model.

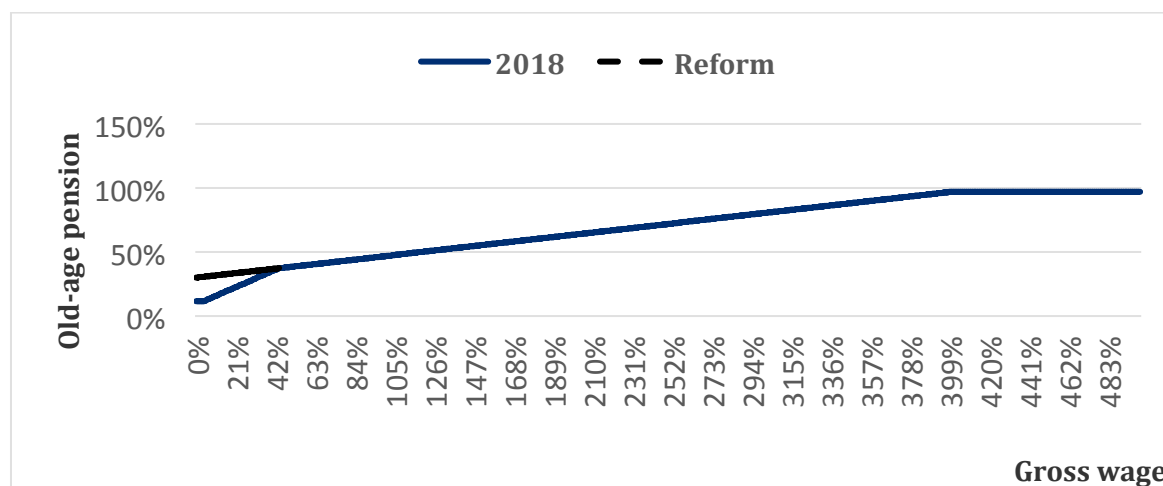
## 2 Material and Methods

The Czech public pensions are unconstitutional and incomprehensible - according to the ruling of the Czech Constitutional Court in 2010 [2]. The Constitutional Court removed their unconstitutionality by abolishing Section 15, containing 3 bend points and respective coefficients. The government disagreed with the ruling, re-introducing the bend points - in a modified form. The government did not thereby eliminate the fundamental problem: old-age and related pensions are still largely independent of earnings or paid premiums, and it is not right to refer to them as pension insurance benefits. However, there was a significant shift: the second bend point was significantly increased - up to 400% NAE, which is well above the normal

earnings ceiling in social insurance (150-200% NAE). The first bend point remained roughly at the old level, and it was newly parameterized at 44% NAE. Such a low bend point is completely outside the international analysts' score: for example, in determining the degree of progressiveness of public pension in different countries the OECD considers the "minimum" amount of income, from which the pension is calculated, 50% NAE. In the 50-400% NAE interval, the amount of pension depending on NAE is a line - see Figure 1. From this line itself it could be obvious that an adequate technical reform can be introduced in a relatively brief time, from 2020.

The elimination of unconstitutional bend points and coefficients is thus relatively easy under the current Czech conditions, in addition under the conditions where the pensions have two parts: the basic amount and the percentage amount, which maintain a separate "existence" after their calculation and they are also indexed differently. The result of the small pension reform is even the "parameterization" of the basic amount at the level of 9% NAE. The percentage amount of the pension continues to be calculated according to the classical DB pension formula, but with a significant reduction from the first bend point of 44% NAE: earnings above this low limit are reduced to only 26% in the calculation of the percentage amount.

**Figure 1. Pension dependence on gross wage (both in % of NAE, 43 years of insurance) (Source: Author)**



Current basic amount is a de facto flat-rate pension of 9% NAE for all pensioners and the percentage amount comprises in the range of 44-400% NAE the DB earnings-related pension. The only strange element is the level of pension for people with average earnings of up to 44% NAE; if we get rid of it, we achieve a significant rationalization of pensions, which should immediately lead to the rationalization of the personal income tax.

The line leading from 400% NAE to 44% NAE can easily be stretched to the point 0% NAE; with 43 years of insurance, this line crosses the y-axis exactly at 30% NAE. From it follows that we can increase the current basic amount/pension from today's 9% NAE to 30% NAE, while reducing the 1.5% annual insurance credit to  $1.5\% * 26\% = 0.39\%$ . This is the core of the proposed small pension reform for 2020. Example: According to the present rules, the total old-age pension of CZK 14,000 in 2018 comprises a basic amount of CZK 2,700 (9% NAE) and a percentage amount of CZK 11,300. After the small reform, the same pension of CZK 14,000 will consist of a basic pension of CZK 9,000 and an insurance pension of CZK 5,000. It is very simple.

The core of the small pension reform from 2020 is the "exchange" of the roles of the basic and percentage amounts of pensions. The basic amount/pension will be newly the basic pension benefit; the typically a significantly lower earnings-related pension will reflect the actual importance of social pension insurance.

Significant reform of pension insurance premiums is necessary and easy to implement along with the small pension reform of 2020. Restructuring the basic and percentage amounts immediately results in a reduction of the pension insurance premium rate by about 11% of

wages. The basic pension is to be financed by general taxes. Separate financing of social pension insurance (from a social pension insurance fund) is meaningful only in the context of a large pension reform that would also introduce independent stabilization mechanisms, including the creation of a significant reserve fund. Such a large-scale pension reform is possible (at the earliest) from 2022. Foreign experience shows that social pension insurance can work effectively within the state budget as well. It is also because the state subsidies such as substitute periods of insurance for the care of young children are part of a modern (e.g. German or Austrian) social pension insurance scheme. Even in case of separate financing of German social pension insurance, there is a close link with the state budget - the state finances non-insurable elements of the system. In addition, in Germany there are approximately 10 pension systems of different types existing in parallel. In the basic social insurance system, the state significantly reduces the rate of premium growth in favour of the competitiveness of the German economy - and for this reason the system is subsidized from the state budget [1].

The issue of social and health insurance premiums can be dealt with in a very pragmatic way: it is essential that Czech employees now pay a total premium of 11% of the gross wage and the employers 34% of the gross wage. And besides, there is a fact that the personal income tax rate is 15% of the super gross salary, which corresponds to 20.1% of the gross wage, which is a relatively low rate in relation to the Western countries [10]. By integrating employee earnings into the personal income tax, we will substantially approximate the "normal" level of employee income taxation in Western Europe. Because of the 2020 reform the entire employee insurance premiums would be cancelled. The total premium rate paid by employers remain untouched.

From 2020, the entire system of health insurance premium collection can be substantially rationalized. A single (direct) collection point is sufficient - together with other social insurance premiums. The recipient of the premium may be the Health Fund (Germany, the Netherlands) or even more simply the state budget in our country. The premium rate (13.5% of the gross wage) is too high. The health insurance premium is essentially a payroll tax. The reform of the entire health care system cannot be implemented by 1 January 2020. It is sufficient to that date to start consciously treating these premiums as a payroll tax paid by employers. This tax should cease to be levied from "persons with no taxable incomes". Also, the insurance premium payments for "state insureds" are non-systemic would be replaced by direct state subsidies to the health fund or simply disappear within the state budget.

Our analysis thus concludes that the personal income tax reform (absorption of employee insurance premiums) and the unification of levying social and health insurance premiums paid by employers may and should be realized with the small pension reform of 2020.

The new personal income tax could easily be more progressive than today. With the introduction of the flat-rate tax since 2008, the tax progressively has been implemented (exclusively) in the form of a tax credit for the taxpayer. Whereas at that time the income tax progressivity was quite average within the OECD countries, it is now below average - and the only reason is that the tax credit has not yet been valorised at all, it is still at its original level (CZK 2,070 monthly; originally it was 9% NAE). To restore original progressivity and maintain it, it is "sufficient" to redefine/ parameterize this tax credit of 9% NAE!

In the reform of the personal income tax, other aspects can also be applied: interest in decreasing or increasing the tax rate, and it is always necessary to review also the amount of tax deductions - with a notable change in the rate, the absolute amount of state support e.g. of such products as mortgages, supplementary pension savings and private life insurance also significantly changes. A consistent socio-liberal policy in this direction would comprise abolishing all this state support.

The minimum goal of reforming subsidies for savings and insurance products is to unify them for all relevant clients, products and their providers. In the world, the EET (exempt, exempt, taxed) tax regime is the most frequent system: the income tax is (just!) deferred, payments from the system are fully taxed. The TEE tax regime, where contributions are paid from fully taxed income, and revenue for clients is not taxed, forms an alternative. With a relatively stable income tax rate(s), these two basic regimes are equivalent - and then it is

rational to use the TEE one because it is considerably easier to administer: State support consists in exempting interest and other capital income from the income tax, state contributions do not exist, as there is no taxation of benefits in any form [4]. The minimum objective of the income tax reform is therefore the transition to the TEE tax regime. “Maximum” is the abolition of state support for all financial products from 2020, which fully fits into the social-liberal social model and which would allow, for example, to reduce the income tax revenue by about CZK 30 billion annually.

Family policy in developed countries is based on basic family benefits for dependent children, maternity and parental benefits, and care for children under the age of 6. Family benefits mean both universal and tested child allowances, as well as universal and tested tax credits for children. The Czech refundable tax credits and benefits for children contribute (only) less than one third of the child costs in families with average income. From this point of view, it is reasonable and effective both to further increase the level of family support and to fundamentally rationalize the benefits from the point of view of social-liberal policy. Similarly, maternity benefits and parental benefits are to be reformed.

From 2020, child tax credit and income-tested child allowance may be replaced by universal child benefits paid by the Financial Administration primarily in line with the personal income tax. In the basic version, the employer must pay out benefits at the same time as wages. Universal benefits may be automatically valorised annually - their amount may be determined as follows: 8% NAE for the first child, 9% NAE for the second child and 10% NAE for the third and every other dependent child. The social-liberal concept of basic family allowances accepts only the universal child allowances, not a conditional child benefit. It is possible to incorporate universal child allowances into the personal income taxation, in the form of a fully unconditional refundable tax credit.

For parents of children born after 2019, maternity allowance and parental allowance may be merged into a new parental sickness insurance benefit to be paid at 100% of the gross wage (at least 50% NAE and maximum 200% NAE) e.g. for the duration of 100 weeks (150 weeks for twins). Parental allowance will be subject to the reformed wage tax. Both the European Commission and the European Parliament recommend the payment of the parental benefit at 100% of the wage.

One of the key tasks of modern family policy is to secure the right to a place in kindergarten and nursery from the first year of the child’s age. From the reform of family benefits and services, we also expect a significant increase in maternal employment [3].

### **3 Results and Discussion**

From 2020 the small pension reform the current old-age pensions split into a universal basic pension of 30% NAE (solidary pillar) and a percentage amount of old-age pension (social old-age insurance). For the purposes of greater clarity and wider potential use of social pension insurance, its subsequent major upgrading to the NDC system is expedient [5]. This large pension reform can be prepared within 2 years from the political decision. Consideration will also be given to a generally desirable transition to the system of pension income taxation – without any negative net income impact on pensioners in the standard cases.

The scope of the pension reform is to be extended by the retirement age question. The solidary pillar should contain a fixed retirement age; in the insurance pillar, this age should be flexible. With regard to today’s overwhelming retirement just after reaching the current basic retirement age, we recommend that the statutory retirement age in the solidary pillar be equal to the current statutory retirement age of men (including its growth under the current law). And on the contrary, we can afford a statutory retirement age of 60 in the insurance pillar – the “early” retirement option will cease; the system will be simpler.

Disability pensions would be transferred to the sickness insurance scheme at the latest on the date of the large pension reform, whereas they will begin to be taxed together with other

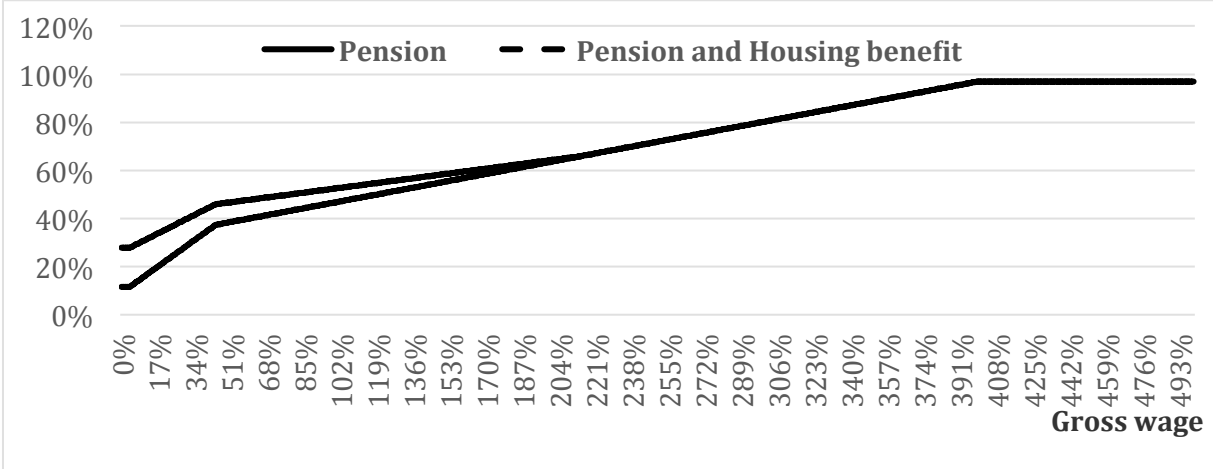
benefits of this insurance. All these benefits will be simplified by the abolition of bend points and coefficients. It will unify, among others, the construction of sickness insurance benefits with the construction of wage compensation in case of incapacity for work provided by employers in the first 2 weeks of this incapacity.

The importance of widow and widower pensions has been in decline worldwide, and this is also true in modern social insurance schemes. Social-liberal policy recognizes individual pension entitlements and accounts only, not joint entitlements and accounts. At the same time, it also allows transfers between spouses' accounts, and more generally, voluntary contributions to individual accounts [11]. Under the pension reform of 2020 and 2022, already paid widow and widower pensions will not change. As for newly granted widow/widower pensions, their pay-out can be limited to several years or even months, and we may explain this solution as a bridging of the financially more difficult period after the death of the partner. Another solution is also a one-time allowance (in case of death) or continuing payment of the old-age or disability pension after the pensioner's death, for example, for one or two quarters of year. However, if the paradigm reform of widow/widower pensions would be politically impassable, it can be postponed.

Orphan pensions need not be a retirement benefit; they can be replaced by a supplement to the universal child allowance. A universal surcharge for a universal child allowance could be, for example, 20% of the NAE, together with a child benefit e.g. 30% NAE. In case of an orphan losing both mother and father, this would be a total dose of 50% NAE. If universal child benefits are to be introduced from 2020, the orphan supplement can be realized at the same time.

The necessary reform of housing benefits represents a follow-up to the pension reform. The housing allowance for the elderly (65+) should follow on the basic pension and the social insurance pension as of 2020 and should be granted in principle for a period of one year (not for a quarter as it is here). Foreign experience shows that managing the senior housing allowance by the provider of retirement pensions is optimal. Calculation of senior housing allowance can be significantly easier than today in the Czech Republic. The most simplified structure of the senior housing allowance could use the formula of the income-tested retirement pension with the following parameters e.g.: 17% NAE - 30% P, where P is the amount of public (and occupational) pensions. The minimum individual income of an employee with a low lifetime income would be 38% NAE (CZK 11,400 monthly in 2018) in this case. Today, this minimum pension for a single pensioner, increased by the rental housing benefit, amounts to CZK 10,130 (in Prague), in a city with 50,000 to 99,999 inhabitants up to CZK 8,400 - see Figure 2.

**Figure 2. Single pension and rental housing benefit in a town with less than 100.000 inhabitants as a function of gross wage in 2018 (all in % of NAE) (Source: Author)**



The main objective of the proposed reform of the elderly housing benefit is its substantial simplification and the associated comfort and clarity; for today's Czech practice, it is typical that

most seniors who are eligible for a housing benefit does not apply for it due to ignorance and stigmatization at all. The small pension reform of 2020 would reduce the total “space” for the application of housing benefits yet due to the introduction of a basic pension in the amount of CZK 9,000 per month. The reform of the housing benefit for the elderly is thus achievable as part of the small pension reform.

#### **4 Conclusion**

Czechia has an out-dated and unnecessarily complicated pension system, which is also reflected in the structure of public revenues; it does not generate desirable motivation and it is also unconstitutional. A key deformation element comprises disregarding the crucial importance of the solidary component of old-age pensions for the financing of these pensions, which is concealed with the substantial contribution of the first bend point in the calculation of the percentage amount of pensions. This is reflected in excessively high rate of the pension insurance premium. Public healthcare financing is also non-rational, ranging from a fragmented premium collection to the excessive total rate of premiums for employees and employers. Employee pension and health insurance contributions are not coordinated with the collection of personal income tax; the progressivity of this tax has not been updated since the introduction of its new concept in 2008. We also have a very fragmented and, thus, non-systemic (and also extreme), subsidization of private pension savings, which serves in fact only for the purpose of tax optimization. Seniors do not make use of the housing benefit – due to ignorance and unnecessary complications. The housing benefit for seniors can be, under the Czech conditions, easily replaced by an income-tested pension supplement. Seniors do not have equal access to family benefits where the child tax credits play a key role. The combination of the universal child tax credit and the income-tested child benefit is unusual or at least unnecessary, even disregarding the seniors.

By coordinating the tax and social policy, the entire system of pensions and related benefits can be significantly rationalized, including a corresponding reduction in the number and scope of agendas and their staffing. Some reforms can be implemented with the effect from 2020; a large pension reform that transforms an obsolete pension system into a comprehensive and flexible modern system of personal pension accounts (NDC) requires a longer preparation – it is feasible since 2022. Already with regard to the envisaged income tax reform by the Ministry of Finance, we need a second “small” pension reform, consisting in the abolition of the first bend point in the calculation of the old-age pension and in the reduction of pension insurance premiums by 11% of the gross wage to be made along with the current “exchange of” premiums between employees and employers; the overall result of rationalization will be the inclusion of employee insurance premiums into the personal income tax and the exclusive payment of insurance premiums by the employers. At the same time, a single collection point for health insurance premiums can be introduced and even all social and health insurance contributions may be combined into national insurance contributions paid by employers. The technical pension and tax reform is expected to be effective as of 2020. At the same time, it is possible and desirable to implement the transition to universal child benefits at the level of 8-10% of the average national gross wage, paid primarily from the Financial Administration system. And, starting in 2020, the transition to a single parental benefit of 100% of the gross wage that will be taxed and paid for about 100 weeks (150 weeks for twins) can be started. Significantly increased labour supply from families with young children can be expected also in connection with the legal entitlement to a place in kindergartens and nurseries from the first year of a child’s age. A similar effect is expected from the large pension reform from 2022 onwards.

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# The Influence of Changes in the Structure of Child Tax Credit on the Level of the Tax Wedge in Poland

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## Abstract

The main objective of the study was to investigate the impact of changes in the structure of child tax credit on the level of the tax wedge in Poland and comparing the level of family support with tax preferences in Poland and selected European Union countries. The following research methods were used: analysis of the literature on the subject and legal acts, analysis of statistical data and comparative analysis. The study used the author's own calculations and the OECD database. The conducted study did not confirm the research hypothesis which says that the level of family support through tax preferences in Poland in comparison with selected European Union countries, measured by the difference in the tax wedge level for different types of families is low. However, it made it possible to confirm that the changes in the structure of child tax credit introduced as of January 1, 2015, did not significantly contribute to its increase. Support for families through tax preferences in Poland, including by means of child tax credit, does not work properly. It does not fully implement the assumed objectives, which included, among other things, the improvement of the financial situation of families with children, which was consequently supposed to contribute to the increase in the fertility rate in Poland. Therefore, it is necessary to outline the direction of changes in the fiscal policy in Poland, aimed at supporting the operation of the family policy.

*Keywords: child tax credit; tax preferences; tax wedge; family policy*

JEL Classification: H20, H31, J13

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## 1 Introduction

Since the beginning of the 1990s, there has been a trend observed in Poland as to the reducing fertility rate. The fertility rate has fallen dramatically over the last 27 years from 2.06 in 1990 to 1.32 in 2015, while the EU average is 1.58 [6]. According to the CIA data for 2017, the fertility rate in Poland is 1.35 and is 0.75 lower than the level ensuring simple replacement of generations amounting to approx. 2.1 [4]. In 2017, Poland was the country with the lowest fertility rate among the EU Member States and ranked 215th among 224 countries surveyed in this respect [4]. Projections of Poland's demographic situation are pessimistic, which is emphasised in numerous reports by governmental and non-governmental institutions, and the demographic situation has been defined by the Government Population Council as a demographic crisis [17]. This situation is extremely dangerous from the point of view of the socio-economic situation. A permanent decline in the number of the country's inhabitants may lead to many negative consequences, such as the decline in labour supply, the instability of the public finance system, the threat to the pension system, the slowing down of GDP growth or a significant reduction in GDP [2, 15]. Therefore, it is necessary to define long-term actions of the state aimed at improving the demographic situation of Poland by using appropriate tools and controlling the actions taken so far.

The natural environment for the birth and development of human beings is the family, which is the basic social institution which, in fulfilling its functions, influences the development of the country's social structure. On the one hand, the family has an impact on the functioning of society by satisfying the needs of its members, who are members of society at the same time, and on the other hand, it is dependent on the socio-economic, cultural or political situation in which it functions [3]. These conditions may have a positive or negative impact on the performance of family functions. Creating favourable conditions for the proper functioning of families is one of

the assumptions of the state's family policy, i.e. measures taken to improve the living conditions and the functioning of families in order to achieve the desired change in the structure of society and its development [1]. The paper focuses on activities undertaken by the state aimed at eliminating economic threats that may have a destructive impact on the family institution, which include, among others, income shortages, high family costs and the inability to work.

As part of the state's activities in the field of a family policy aimed at improving the financial situation of families, we can distinguish actions involving direct or indirect financial support for families. The former include, among others, family benefits, allowances, subsidies and other direct financial transfers to families, traditionally carried out through public expenditure. Indirect family support can be provided, among others, through the tax system, by means of which the governing body influences the level of the family's fiscal burden and consequently the level of disposable income. Specially designed tax reliefs included in the structure of particular taxes result in the depletion of state budget revenues and redirecting public funds to beneficiaries by reducing the final tax burden on the taxpayer. Public expenditure implemented in this way in the literature on the subject is referred to as tax expenditures [5].

In Poland, in the years 2009-2014, the main area supported by the state through tax preferences was the area referred to as: "family and social assistance". In 2014, tax preferences in this area constituted 43% of all preferences functioning in the Polish tax system and amounted to approx. PLN 37.7 billion [10]. Realised public expenditures for this purpose, under special reliefs and deductions included in the structure of personal income tax, amounted to PLN 13.1 billion. The most important PIT tax relief was a child tax credit, thanks to which about PLN 6.9 billion was granted to Polish families, which accounted for almost 53% of the value of all preferences under this tax [10].

Research on the changes taking place in the structure of child tax credit and their impact on the implementation of its objectives is necessary because, so far, it is the most important instrument functioning within the framework of income tax aimed at supporting the family. Therefore, the main objective of the study is to investigate the impact of changes in the structure of child tax credit introduced as of January 1, 2015, on the level of the tax wedge in Poland and comparing the level of family support with tax preferences in Poland and selected European Union countries. A research hypothesis was formed saying that the level of family support by means of tax preferences in Poland compared to selected EU countries, as measured by the difference in tax wedge level for different types of families is low. Changes in the structure of the child tax credit introduced as of January 1, 2015, did not significantly contribute to its increase.

This paper is part of a broader research on the analysis of functioning family support instruments that the author is leading. Therefore, the author deliberately limited the research to analysing the level of family support through tax preferences in selected EU countries and omitted other forms of family support.

## **2 Material and Methods**

In order to verify the research hypothesis, the study was divided into two stages. In the first stage, the focus was on the analysis of changes in the structure of the child tax credit in force in Poland and their impact on the tax wedge level. The second stage of the survey involved comparing the level of family support through tax preferences in Poland with selected European Union countries.

### *2.1 Child tax credit in Poland*

Examining the impact of changes in the structure of child tax credit on the level of tax wedge in Poland required firstly an analysis of changes in the Polish legal regulations on personal income tax. Existing legal acts, the literature on the subject and data from the Ministry

of Finance were used for this purpose. Then, simulations were conducted of the tax wedge level before and after the changes in the structure of child tax credit for different types of families. The author assumed that the tax wedge is the difference between the total cost of employment paid by the employer and the net remuneration of the employee expressed in percentages [7]. For the simulation of the tax wedge level, the formula (1) was used.

An analysis of the Polish legal regulations and the literature on the subject made it possible to determine the components of the tax wedge in 2017. These include social and health insurance contributions and personal income tax paid by employees. The employer pays social security contributions and contributions to the Labour Fund and Guaranteed Employee Benefits Fund for the employee [8, 14, 18]. The simulation takes into account only workers employed under an employment contract.

Three types of families were selected for the simulation, varying in terms of the number of family members, the number of family earners and the amount of income earned. The simulation compared the tax wedge level before and after changes in the child tax credit for a given family type. The calculations were made for the projected average salary in Poland in 2017, amounting to 51,156 PLN per annum.

## 2.2 Supporting the family with tax preferences in the countries of the European Union

In the second stage, the level of family support through tax preferences in selected European Union countries was examined. The statistical data analysis and comparative analysis were used for this part of the study.

Only the EU countries being members of OECD were subject to the analysis. The level of family support by tax preferences in the researched countries was measured by the difference in tax wedge level for two types of families. Families with the same income level, differing by having two or no children, were compared. The first type of family: Two-earner married couple, one at 100% of average earnings and the other at 33%, no child (Family I). The second type of family: Two-earner married couple, one at 100% of average earnings and the other at 33%, 2 children (Family II). The presented family categories have been used in Table 2.

Such a comparison made it possible to determine the level of support for families with children. When the tax wedge level turned out to be lower in a family with two children than in the case of a family without children, it meant that there was a system of family support in a given country through tax preferences. A comparison of the level of support between countries was possible by showing the relative change in the tax wedge level for the analysed types of families. In a situation where the relative reduction of the tax wedge in a given country was higher than in another country, this meant that family support through tax preferences was higher in that country. The author concluded that the tax wedge is a good measure of the level of family support by means of tax preferences because it takes into account the income tax paid by the taxpayer, the amount of which is influenced precisely by tax preferences in the form of various types of reliefs aimed at supporting families.

The analysis used statistical data on the tax wedge in the web-based database and OECD reports [11, 12, 13]. In order to show the actual level of family support by means of tax preferences, a modified tax wedge calculation formula used in the OECD methodology [11] was applied:

$$\text{Tax wedge} = \frac{\text{PIT} + \text{employee and employer SSCs}}{\text{Total labour costs (gross wages + employer SSCs)}} \quad (1)$$

Legend: PIT – Personal Income Tax  
SSCs – social security contributions

The difference between the formula and the OECD methodology is that direct money transfers from the state budget to families with children are omitted from the tax wedge. The applied modification of the tax wedge calculation formula was necessary due to the fact that

most of the analysed countries had direct cash transfers from the state budget, which resulted in lowering the tax wedge level, which in turn could lead to an incorrect interpretation of the results. This has eliminated the impact of these transfers on the tax wedge level in all countries and has shown the actual level of support for families through tax preferences.

The author would also like to draw attention to the fact that in the OECD methodology, a part of the pension contribution in the amount of 7.3% of gross wage paid by an employee and employer in Poland is not included as a component of the tax wedge. This may result in a slight understatement of the tax wedge in relation to the actual situation. The OECD methodology may not include some components of the tax wedge in other countries as well. Checking for possible inaccuracies in the methodology used was not the purpose of the study, and it was therefore accepted that the data made available by the OECD could be used as a basis for this study.

### **3 Results and Discussion**

#### *3.1 Child tax credit in Poland*

The child tax credit has been an element of the personal income tax structure in Poland since 2007. It was introduced due to unfavourable demographic indicators of the country and the declining fertility rate. Its aim was to support all families with children, regardless of their income or material status [9]. The so-called childcare relief can be used only by taxpayers who pay personal income tax on the general rules according to the tax scale. This means that the aid is directed primarily at those who work and earn income from work. On the other hand, the child tax credit is not available to families who earn income from sources taxed on other grounds, e.g. farmers subject to agricultural tax [2, 14]. The essence of the relief is the reduction of income tax calculated by the taxpayer in the annual statement by a specified amount.

Under the 2007 legislation, the taxpayer who took care of a child could deduct from the income tax an amount of PLN 1,145.08 per child, regardless of what income they earned and how many children they had [14, 15]. The amount of the deduction was also unaffected by when the child was born, meaning that the full amount of the deduction could have been used by a taxpayer whose child was born even in December. The limitation as to the possibility to benefit from the full deduction of the relief was the amount of income tax calculated on the annual income tax return. The taxpayer could not fully benefit from the amount of the deduction if the calculated tax was lower than the amount of the deduction.

In the years 2007-2013, two significant modifications were made to the child tax credit. In 2009, the procedure for settling the relief was changed from annual to monthly, which resulted in the relief being due for an actual period of childcare [15]. From 2013 onwards, child tax credit depends on the number of children and the level of family income. Deductions for the third and every subsequent child in the family have been increased and the benefits for families with one child whose annual income exceeds PLN 112,000 or PLN 56,000 for single parents have been reduced [14, 15].

Recent changes to the child tax credit were introduced on January 1, 2015. The amount of the deduction increased again from the third child in the family. Since that year, the amount of annual deductions for the first and second child is PLN 1,112.04, PLN 2,000.04 for the third child and PLN 2,700 for each subsequent child. The new regulation was supposed to significantly support families with many children. The second change introduced in the structure of the child tax credit is that if the taxpayer is unable to deduct the full amount of the relief due to too low tax to pay, the remainder of the unused amount is refunded. However, the refund may not exceed the amount of social security and health insurance contributions that have been deducted from the tax return for the year concerned [14].

The simulation of the tax wedge level for different types of families shows that the situation of married couples, with one or two children, earning 100% or 133% of the average earnings did not change as a result of changes in the child tax credit (Table 1). There is a slight

decrease in the tax wedge level among single parents of two children earning 67% of the average earnings. In this case, as a result of the changes introduced, the tax wedge level decreased by 1.31 pp. The increase in the amount of deduction per third child resulted in a significant reduction in the tax wedge for single parents of three children, where the tax wedge was reduced by 6.15 pp., which means that the fiscal burden on the family decreased by approx. 17.6%. In the case of families with an income of up to 100% or 133% of the average earnings and three children, the tax wedge level decreased slightly. In this cases, as a result of the changes introduced, the tax wedge level decreased by 1.7 pp. for first family and -0.4 pp. for second family.

**Table 1. Tax wedge for different types of families before and after changes in the structure of the child tax credit in Poland in 2017. (Source: Author based on [8, 14, 18])**

Family description	Tax wedge for family with:								
	One child			Two children			Three children		
	B	A	D (B-A)	B	A	D(B-A)	B	A	D(B-A)
Single person at 67% of average earning	36.27	36.27	-	34.89	33.58	-1.31	34.89	28.74	-6.15
One-earner married couple at 100% of average earning	38.23	38.23	-	36.43	36.43	-	34.89	33.19	-1.7
Two-earner married couple, one at 100% of average earnings and the other at 33%	38.93	38.93	-	37.58	37.58	-	35.54	35.14	-0.4

Legend:

B – average tax wedge before changes in the structure of child tax credit

A – average tax wedge after changes in the structure of child tax credit

D – difference between levels of tax wedges before and after changes in the structure of child tax credit

The analysis carried out shows that the changes introduced in 2015 in the structure of the child tax credit have contributed to the improvement of the financial situation of only some types of families - mainly families with a low income and many children. In other cases, on the other hand, the changes were hardly noticeable. Similar conclusions were also reached by other authors investigating the recent regulations concerning child tax credit [2, 16]. Taking into account the fact that this relief is aimed at increasing the fertility rate in Poland, it could be said that this is a good direction for family policy because it promotes the model of a large family. On the other hand, however, we should pay attention to the currently dominant family models in Poland, i.e. models of a family with one or two children, which constitute about 88.5% of all types of families with children [3]. For these families, the level of support by means of the described relief has not changed and the amount of the deduction has decreased since its introduction and has not changed since 2009. According to the author, it is these families that should be concentrated on by introducing further modifications of the above-mentioned tax relief. The child tax credit should be modified in such a way that people planning to start a family or enlarge their family by a second child do not feel that their material situation is deteriorating drastically as a result of incurring additional costs connected with bringing up children. Therefore, first, the deducted amount for the first and second child should be increased to a level that takes into account the current economic situation and the increased cost of living compared to the one prevailing at the date of introduction of the deduction in the income tax structure.

### 3.2 Supporting the family with tax preferences in the countries of the European Union

Supporting families by applying tax preferences is not an instrument of family policy used in all EU countries (Table 2.). The group of countries that did not apply tax preferences in 2016

includes Denmark, Ireland, Luxembourg, Sweden and the United Kingdom. This is evidenced by the lack of change in the tax wedge level for the analysed types of families. The level of family support through tax preferences varied in other countries.

Countries with tax preferences to support families can be divided into three groups. The first group with a low level of family support through tax preferences is Estonia, Belgium, Spain, Austria, Greece, and Finland. In these countries, the relative change in the tax wedge level for the analysed families ranged from approx. -4.0% to approx. -0.5%. Poland should be classified into the group of countries with an average level of support, where the change in the tax wedge level ranged from approx. -10.0% to approx. -6.0%. This group also includes Slovenia, Slovakia, the Netherlands, France, and Italy. The group with the highest level of family support through tax preferences comprises Germany, Latvia, the Czech Republic, Hungary, and Portugal. In the case of these countries, the relative change in the tax wedge level for the analysed families ranged from approx. -14.3% to approx. -11.0%.

**Table 2. The tax wedge for different types of families in the EU member countries of the OECD in 2016.**  
(Source: Author based on [11, 12, 13])

Country	Tax wedge for Family I	Tax wedge for Family II	Absolute change	Relative change (%)
Germany	45.21	38.76	-6.45	-14.27
Latvia	41.79	36.02	-5.77	-13.81
Czech Republic	40.64	35.47	-5.17	-12.72
Portugal	36.20	32.01	-4.19	-11.57
Hungary	48.25	42.95	-5.30	-10.98
Slovenia	40.24	36.22	-4.02	-9.99
Poland	35.06	32.06	-3.00	-8.56
Slovak Republic	37.70	34.95	-2.75	-7.29
Netherlands	32.80	30.48	-2.32	-7.07
France	42.68	39.84	-2.84	-6.65
Italy	42.72	40.08	-2.64	-6.18
Estonia	37.95	36.44	-1.51	-3.98
Belgium	45.21	43.70	-1.51	-3.34
Spain	36.61	35.56	-1.05	-2.87
Austria	43.37	42.97	-0.40	-0.92
Greece	38.92	38.65	-0.27	-0.69
Finland	39.62	39.44	-0.18	-0.45
Denmark	34.87	34.87	0.00	0.00
Ireland	19.87	19.87	0.00	0.00
Luxembourg	29.50	29.50	0.00	0.00
Sweden	41.09	41.09	0.00	0.00
United Kingdom	25.80	25.80	0.00	0.00

Poland, despite the fact that it has been classified as a country with an average level of family support through tax preferences, is the country with the lowest fertility rate among the analysed countries. Moreover, countries that do not use tax preferences as an instrument of family policy have a much higher fertility rate than countries that qualify for a high level of family support by means of this instrument. In these countries, fertility rates range from 1.62 in Luxembourg to 1.97 in Ireland [4]. Among the countries with a high use of tax preferences in family policy, the highest fertility rate was 1.53 in Hungary [4].

From this analysis, it can be concluded that the use of tax preferences as an instrument of family policy does not guarantee that the intended effects in the form of higher fertility rates in a given country will be achieved. This raises additional questions which may form the basis for further research work on issues related to the family policy of the state. First of all, what type of instruments should be used within the framework of family policy in Poland in order to contribute to an increase in fertility rates? Indirect or direct? Which are more efficient? Secondly, to whom should state aid in the field of family policy be directed? Thirdly, what is the impact on the state of public finances of the implemented family policy measures?

#### 4 Conclusion

The main objective of the study was to investigate the impact of changes in the structure of the child tax credit introduced as of January 1, 2015, on the level of the tax wedge in Poland and comparing the level of family support with tax preferences in Poland and selected European Union countries. The conducted study did not confirm the research hypothesis which says that the level of family support through tax preferences in Poland in comparison with selected European Union countries, measured by the difference in the tax wedge level for different types of families is low. However, it made it possible to confirm that the changes in the structure of the child tax credit introduced as of January 1, 2015, did not significantly contribute to its increase.

In the author's opinion, support for families through tax preferences in Poland, including by means of child tax credit, does not work properly. It does not fully implement the assumed objectives, which included, among other things, the improvement of the financial situation of families with children, which was consequently supposed to contribute to the increase in the fertility rate in Poland. It is, therefore, necessary to outline the direction of changes in the fiscal policy in Poland, aimed at supporting the family policy.

In the author's opinion, the deducted amounts due under the child tax credit should be adjusted above all to the current economic conditions in order to take into account the increased cost of living in comparison to those at the date of introduction of the deduction in the income tax structure. In the longer term, a significant reduction in the level of the tax wedge for dependent employees who are bringing up children should be pursued. Reducing the tax wedge for these people would make them more attractive to employers due to the lower total employment costs. This could also translate into stabilising employment and creating an employment-friendly working environment. Precisely, it is the awareness of the stability of employment that contributes primarily to the decision to have children, which is why the state should focus primarily on this aspect.

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**SESSION III:  
PUBLIC SERVICES  
AND NON-PROFIT SECTOR**

# Social Construction of Parents Refusing Vaccines

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## Abstract

Although vaccination in the Czech Republic is mandatory and presented as an important part of public health policy, the number of parents who refuse childhood vaccination has increased in recent years. Thus, the Czech Republic follows the trend of some other European countries when vaccination coverage has started to decline. In this paper we focus on the issue of compulsory vaccination and we employ qualitative analysis to define and examine policy design of vaccination policy and social construction of parents who refuse to vaccinate their children. The paper aims to answer whether and how the social construction is reflected in the public policy applied to the parents. Our approach is based on the theory of the social construction of target population. The main findings point out that the negative image of parents refusing vaccines prevails in media and political discourse and the policy design is based on burdens.

*Keywords: vaccination; anti-vaccine; social construction, public health*

JEL Classification: H41, I12, I18

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## 1 Introduction

Despite the demonstrated success of vaccines in reducing communicable diseases-associated with mortality and morbidity, vaccination rates in the industrialized world are on decline making compulsory vaccination one of current public policy issues. By its nature the issue of compulsory vaccination balances between parents' autonomy in choice and public health. [10]

In general, vaccination is recognized as one of the best means of combating infectious diseases and it is an important tool for primary prevention in the public health protection. The Czech Republic has a long tradition of vaccination (one of the first vaccinations in the territory of today's Czech Republic dates from 1799) and belongs to countries with the highest vaccination coverage rate. The system of compulsory vaccination of children within which children are currently (i.e. in 2017) obligated to be vaccinated with two vaccines against nine illnesses, contributes to high vaccination rate. Although vaccination in the Czech Republic is mandatory and presented as an important part of public health policy, the number of parents who refuse childhood vaccination has increased in recent years and many children are vaccinated late or not at all. Thus, the Czech Republic follows the trend of some other European countries when vaccination coverage has started to decline [6,8]. The Ministry of Health of the Czech Republic responded to the situation by tightening sanctions including penalty for parents for non-vaccinating, for kindergartens for admission of unvaccinated child or even doctors for non-vaccinating.

One of the often-mentioned reasons is paradoxically the positive result of vaccination which has led to a decline of the dangerousness of infectious diseases in public awareness together with an increase of underestimation of the vaccination in population [7,18]. Within the public discourse we may define two totally different groups. The vaccine supporters emphasize the risk of declining herd immunity [4,14] and its negative impact on public health while the opponents emphasize human rights and high vaccination coverage even within voluntary vaccination schemes in some western states [3]. The other level of discussions covers conditions when parents may refuse to vaccinate their children [1,3,11]. The problem lies in the balance between parental autonomy, children's rights and public health [5].

Based on research of 29 European countries in 2011 [9], 15 countries without compulsory vaccination was found while at least one vaccine was required in the remaining 14 countries. Several arguments are put forward against the change from the mandatory to voluntary vaccination. Due to globalization, it is necessary to be prepared for a pandemic of diseases that are already rare in developed countries [4] However, some countries are retreating from voluntary schemes and for example, in 2017 Italy has come to introduce mandatory childhood vaccination.

The paper aims to answer the following research question - whether and how the social construction of parents refusing infant vaccine is reflected in the public policy applied to them. The goal of the paper is to analyse the social construction of these parents based on the theory of the social construction of target population of the authors Anne Schneider and Helen Ingram [19,21] which is considered to be a significant theoretical approach to studying public policy. The theory focuses on the social construction of target population (SCTP) as an essential element of policy agenda and policy design which at the same time it legitimizes policy choices [20] Further, public problems considered as problems are not so much related to their severity but to how they are framed or how they become part of the political agenda [15,17]. Via the SCTP the authors explain the difference among social groups in receiving benefits or burdens and they conceptualize the target population in terms of positive or negative social construction and in terms of strong or weak political power. [19] The combination of power and social construction leads to the definition of four types of target population: Advantaged, Contenders, Dependants and Deviants. The SCTP determines whether a group is perceived as the one that deserves benefits in the form of rights or other privileges, or not and it is rather the subject to restrictions or sanctions. At the same time, the degree of its political power (i.e. available financial resources and political capital) allows them to influence the extent of burden of benefit [17,19]. Target population with little political power is typically addressed by low direct support and, on the contrary, by politics of punishment [20].

## 2 Material and Methods

Both qualitative and quantitative content analysis of articles was incorporated within media analysis and this combination has provided the complementary ways to examine the research question. Media analysis covers four-years period January 2014 to December 2017 and focuses on six national printed periodicals, namely Aha!, Blesk, Hospodářské noviny, Lidové noviny, MF Dnes and Právo.

Articles for the analysis itself were obtained in the Newton Media Search electronic archive. Keyword searching for the term "compulsory vaccinations" (the keyword "children" was not eventually listed because it would have led to the removal of number of relevant articles) led to 382 full text articles. After screening for duplicates and irrelevant articles the file was narrowed to 167 articles.

The legal framework for vaccination in the Czech Republic is defined in §45 and §46 of Act no. 258/2000 Coll. on the protection of public health. The obligation to vaccinate children is further specified by decrees; the most recent is Decree 355 of October 17, 2017, which amends Decree no. 537/2006 Coll., on vaccination against infectious diseases. Before 2014, the system was set restrictively against vaccine refuser and contained both a direct and indirect sanctions. In our paper, we have been following a four-year period since 2014, and in the field of the legislation, we have mapped two amendments (the parliamentary and the senate) to the Public Health Protection Act, one educational amendment and three resolutions of the Constitutional Court, though none of these events altered the restrictive nature of the policy.

Results of media analysis and analysis of amendments to the Act as well as four stenographic records (10<sup>th</sup> March 2015, 28<sup>th</sup> April 2015, 20<sup>th</sup> May 2015, 16<sup>th</sup> September 2015) led to identification of key frames [16] based on wider argumentation context, reflecting both the proposed and the criticized tools [13,23]. The framework analysis method [2,8,16] is mainly associated with the role of ideas and discourses in the field of political action. Particularly in

controversial policy issues, individual actors try to define the problematic political situation and gain control over the policy-making process. The political process is a competition of different frames not only defining the problem but also its possible solution, i.e. the distribution of advantages and loads [16].

### 3 Results and Discussion

In the media, the number of articles on compulsory vaccination reflected both the legislative changes and the incidence of diseases in the Czech Republic or abroad. The predominant frame has only slightly changed over the observed period in the direction to the negative image of vaccine refusers.

In our contribution, we concentrated on the period from 2014, when the amendment to Act 258/2000 Coll. was proposed by the Czech government in July 2014. The original amendment did not address the compulsory vaccination area but during the approval process, a number of amendments resulted in new or extended existing sanctions. The sanctions were already present in the previous law, but the amendment specified the responsible groups (see the table 1) and sanctions that the opponents criticized as too high.

**Table 1 Burdens**

<p>By Act no. 258/2000 Coll., the maximum amount of the financial penalties in the case of non - vaccinating children is set for</p> <ul style="list-style-type: none"><li>• legal representatives of unvaccinated children - CZK 10,000</li><li>• organizers of restorative health care events for children and young people for acceptance of an unvaccinated child - CZK 30,000</li><li>• childcare service providers for acceptance of an unvaccinated child to its facility - 500,000 CZK</li><li>• healthcare providers who are obliged to perform vaccinations and are subject to sanctions for non-obligation - CZK 1,000,000</li></ul> <p>Penalties for legal representatives are significantly lower than for healthcare providers or childcare providers. In particular, healthcare facilities are left in an inconclusive situation, when without any eligible sanction to vaccine refusers, they can hardly fulfil their obligation to perform the compulsory vaccination. They can use only soft methods such as contacting and inviting patients or their legal representatives to the compulsory vaccination, informing them of the possibilities of vaccination and, last but not least, to make refusers sign the vaccination refusal in the medical records. Healthcare facilities can also report refusers to the nearest regional public health authority, which they usually do just to prevent receiving sanctions that can, for most of them, mean insolvency and end of their practice (often case of general practitioners)</p>
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At the same time, specification of vaccination has been kept by a decree. These changes provoked emotional debates in the Parliament and in the arenas of other stakeholders. Disagreement with the proposed amendment was also expressed by a part of the public, the noticeable actors were the Rozalia civic association and the League of Human Rights. Vaccination refusers referred to the Constitution, stating that "everyone can do what is not forbidden by the law, and no one should be forced to do what the law does not impose", and they referred to the fact that the subordinate legislation does not meet the law requirement. This fact was also under an investigation of the Constitutional Court of the Czech Republic (Pl. ÚS 19/14 of 27 January 2015) and there was not found any conflict with the Charter of Fundamental Rights and Freedoms. The Court justified its findings that the primary obligation is imposed by the law, and the subordinate legislation merely specifies it.

By a second resolution (Pl. ÚS 16/14), the Constitutional Court confirmed that vaccination may remain as a condition for the admission of a child to kindergarten, and compulsory

vaccination as a condition of the admission of a child to kindergarten is not an unconstitutional intervention to the right to education. The Court responded to a complaint about the decision of two kindergartens that refused to accept a child due to its un-vaccination. The Court also rejected the proposal for annulment of the relevant regulations of the Act on Public Health Protection. In both cases, the plenary of all fifteen judges decided by majority of 14 votes.

The Chamber of Deputies passed the bill to the Senate in June 2015, which preferred much more moderate approach contrary to the Chamber of Deputies, and returned the bill with substantial proposals of amendments to reduce the severe sanctions. The senatorial proposal did not find enough support and was rejected by three-fourths majority of the deputies present. The law was adopted in September 2015.

The Czech practice in compulsory vaccination and the related limitation of the right to physical integrity is in harmony with the European law. For the Czech Republic, several international documents (issued by UN, WHO, the Council of Europe, the European Union) are relevant. The most important of these are the Convention for the Protection of Human Rights and Fundamental Freedoms, including the right to life, and the European Social Charter, among other things, with the right to health protection, and with the commitment to ensure "*to prevent as far as possible epidemic, endemic and other diseases*". (Article 11 of the European Social Charter). The European Court of Human Rights and the Court of Justice of the European Union also play roles in the area of compulsory vaccination. When considering the rights to privacy of the individual, in particular his physical and mental integrity, and the right to protection of public health, both institutions came to the conclusion that in case of compulsory vaccination it is required to have an acceptable intervention to the right of physical integrity when it is in compliance with national legal system. [5,12,22]

At the end of 2015, a further resolution of the Constitutional Court of the Czech Republic was issued, which concerned complaints when the parents did not vaccinate their children because of their non-religious belief (Pl. ÚS 1253/14 dated 22.12.2015). The Constitutional Court accepted parents' request. The result was similar to the one in 2011, when the Court acknowledged the complaint due to parents' religious belief (Finding III ÚS 449/06 of 3.2.2011).

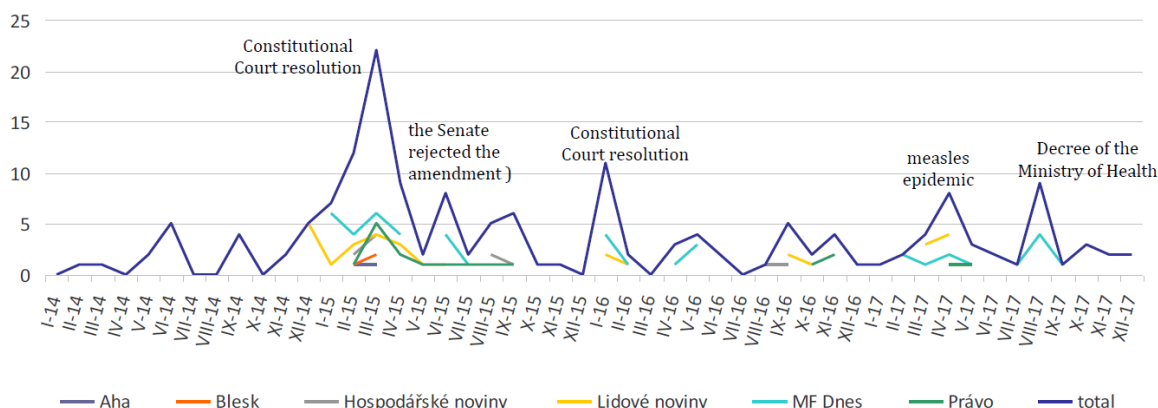
In January 2016, the Senate submitted its amendment proposal to the Act on Public Health Protection, according to which vaccination should not be a condition for the participation of a child in school camps or summer camps, and also, they proposed to reduce the maximum penalty for kindergartens which would accept an unvaccinated child. The amendment proposal ended with the end of the parliamentary term.

The last significant legislative change was brought by the amendment of the so-called Education Act (No. 178/2016 Coll.) which introduces mandatory pre-school education for children over five years of age. It changed the situation in accepting unvaccinated children to the kindergarten, when, thanks to the joint opinion of the Ministry of Health and the Ministry of Education, Youth and Sports (November 2016), unvaccinated children started to be admitted to the pre-schools from 5 years of age.

The media kept a close eye on all these legislative changes. The other field to which media paid attention was the increased incidence of measles and pertussis, both are subject to compulsory vaccination. In particular, local measles epidemics have often appeared in the media along with the topic of vaccine refusers. The subject of compulsory vaccination also appeared in the case of an epidemic of hepatitis, although it was not the type covered by compulsory vaccinations, but because it led to order compulsory vaccination for residents living in Prague 6.

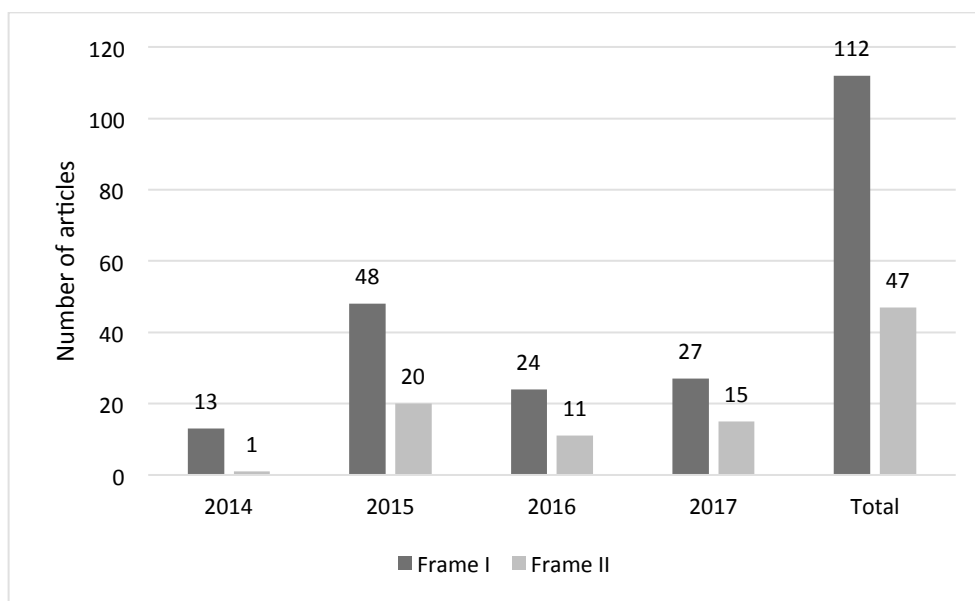
The frequency of articles on compulsory vaccination mirrored the events in public policy, namely changes in the legislation or the incidences of infectious diseases covered by vaccination scheme. The number of articles peaked in March 2015 as a response to the amendment of Public Health Protection Act and its potential impact on the compulsory vaccination. The hepatitis epidemic (June 2015) or the occurrence of measles (spring 2017) and pertussis were also reflected by higher number of articles. The discussion on the compulsory vaccination and anti-vaccination approaches were discussed every time after the findings of the Constitutional Court (See Figure 1).

**Figure 1 The frequency of articles on compulsory vaccination 2014-2017 (Source: Author)**



Within the analysis of media and political discourse, it is possible to identify two different frames (See Table 2) - *Frame I – Parents as irresponsible black passengers* and *Frame II – Parents as victims of too paternalistic state*. During monitored period Frame I (see Figure 2) is more frequent (67% of monitored articles in total). In 23 articles, both frames appeared.

**Figure 2 The frequency of Frames 2014-2017 (Source: Author)**



Within *Frame I – Parents as irresponsible black passengers* the target group of parents is negatively constructed and parents are labelled as “irresponsible”, “arrogant”, “threaten their children”, “don’t believe in scientific arguments” etc. The holders of this frame are usually actors from the political and medical arenas; quite often these actors represent both areas – e.g. Chairman of Czech Vaccination Society, Deputy of Minister of Health, Members of Parliament or Ministers of Health with medical profession. They do not represent the frame just in the Chamber of Deputies but very often in the media as well, where their opinions are presented as opinions of experts. In 91 articles, advocates of compulsory vaccination were listed, including 67 articles with particular names (in 57 articles named at least one doctor). The difference between the approach of medical and non-medical members of Parliament was visible also during their

discussions on the amendment of Public Health Protection Act and was even noticed by the media, when medical actors are characterized by more repressive approach.

*Frame II – Parents as victims of too paternalistic state* is less frequent and in media often appears in opinions or comments section. The parents’ refusal is illustrated as the expression of their concerns about unnatural medical interventions, unsafe vaccines or mistrust of the motivations of pharmaceutical companies. Often parents argue for the personal freedom. Within political arena this approach is not widespread and it appears rather in the Senate than in the Chamber of Deputies. The state is identified as “totalitarian” which “appropriates the right to children's health”. The holders of this frame are typically parents, two associations (namely Rozalio or the League of Human Rights) and rarely doctors. In 38 articles presenting opponents to contemporary compulsory vaccination just one doctor was named and in the same time it was mentioned that the doctor received anti-award Erratic boulder by Sisyfos, the Czech scientific skeptics' club.

**Table 2 Definition of Frames (Source: Author)**

Frame categories	Characteristics – Frame I	Characteristics – Frame II
<i>Social construction of target group</i>	Negative	Neutral
<i>Defining problems</i>	Reducing herd immunity	Children's ostracizing and sanctioning
<i>Policy instruments</i>	Restrictive sanctions for parents, kindergartens, doctors	Reducing financial sanctions for non-vaccination or allowing unvaccinated children to participate in camps
<i>Benefit / burden distribution</i>	Burden	Reduction or cancellation of burdens
<i>Justification of the policy proposal</i>	Protection of public health (sustaining of collective immunity), child health protection	Enable socialization of children in collective at out-of-school events and abolition of liquidation sanctions for school facilities and organizers of children camps

#### 4 Conclusion

To conclude, the negative image of parents refusing vaccines prevails (Frame I) both in medial and political discourse. The policy design is based on burdens including direct sanctions aimed at parents as well as indirect sanctions when high fine make childcare service providers refuse unvaccinated children. For the same reason organizers of restorative health care events for children and young people do not accept an unvaccinated child. Policy design does not take into consideration whether parents only require an alternative vaccination calendar or whether they refuse to vaccinate at all. Based on the theory of social construction of target population we can summarize that negative image in media in combination with restrictive public policy design constructed parents as “deviants”, i.e. negatively constructed group with rather small political power.

Social construction of target population is dynamic process and social construction changes in time. During last few years, parents have also experienced several partial successes (the Constitutional Court resolutions or proposals to reduce sanctions in the Senate), and their political power can be expected to grow. Supposing absence of epidemic of infectious diseases for longer period their increasing political power could lead to their shift from „deviants“ to „contenders“ in the future.

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# Too Generous Subsidies? Transparency of Nonprofit Organizations with Generous Public Funding

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## Abstract

Transparency of nonprofit organizations typically vary according to organization's nature, type, environment and many other factors. It is assumed, organizations co-operating with the governmental sector and receiving public funding should in larger extent exhibit higher level of transparency. Therefore, this paper objective is to identify current image of transparency in nonprofit organizations (N=28) with subsidies from the Czech governmental budget exceeding €2 million in 2016. Research data were gathered with use of public register search and the content analysis of organizational websites. Four main domains were investigated: existence of organizational website, availability of main organizational documents (statutes, annual reports), presence and quality of strategic statements, and publishing of financial statements of organization. Findings showed big differences in transparency of organizations with sport organizations on one end of the scale, where transparency is very low and even these organizations do not keep legal requirements, and organizations providing social services, which usually higher transparency than it is required by legislation. Moreover, examples of bad practice and non-standard and non-systematic funding are also presented.

*Keywords: transparency; Czech Republic; not-for-profit sector; nonprofit organization; content analysis*

JEL Classification: H20, L31

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## 1 Introduction

Today, the transparency is one of the real issues of the nonprofit sector. Transparency itself is a very complex term. Alnoor Ebrahim [6] notes that it is: Relational in nature and is constructed through inter- and intra organizational relationships. Complicated by the dual role of nonprofits as both principals and agents in their relationships with other actors. Characteristics of transparency necessarily vary with the type of nonprofit organization being examined. It operates through external as well as internal processes, such that an emphasis on external oversight and control misses other dimensions of accountability essential to nonprofit organizations. Arshad et al. [1] and Burger and Owens [4] argue that transparency represents one of the critical dimensions of accountability, together with answerability or justification, compliance, and enforcement or sanctions. Accountability of nonprofit organizations (NPOs) is significant for many reasons. At first, it generates trust among relevant stakeholders and thus helps to NPOs build their resources, both material ones – such as financial and human resources— and intangible ones, as legitimacy in the eyes of policy makers and society in general [8]. At second, NPOs are accountable to multiple stakeholders. NPOs not only have upward, downward, and horizontal accountabilities to fulfill, but as far as they are tax exempt in most countries, all taxpayers constitute a major group of stakeholders [11]. Literature review shows two basic approaches to accountability: hierarchical and holistic. The hierarchical “is narrowly functional, short-term in orientation and favors accountability to those stakeholders who control access to key resources for both resource use and immediate impacts” [15]. This approach emphasizes accountability to powerful patrons (upward accountability)—donors and governments—thus narrowing accountability relationships [6, 7]. The holistic accountability “considers multiple stakeholder groups, with a significant emphasis being placed on downward accountability to beneficiaries [5] in addition to upward accountability to donors and governments” [15].

## 2 Transparency specifics in the Czech Republic

### 2.1 Czech discussion on transparency of nonprofit organizations

Pospíšil [17] add that even the principle of transparency is recognized in general, Czech NPOs still contend with many problems and the reality is insufficient. The reasons lie in three facts: (a) vague content of transparency resulting in quandary in its application, (b) deficit of proper data and knowledge about the situation in the nonprofit sector, and (c) the absence of a discussion that would set requirements for legislation and separate the debate on transparency and the debate about reporting. In recent years, Czech NPOs transparency was frequently involved in many public debates initiated from both, the Czech government (for example project Moneyval) as well as nonprofit itself (assessment of nonprofit reliability by AVPO ČR, Nonprofit of the Year by NROS). However, only few research studies were conducted. For example study focusing on organizational transparency realized on the sample of 2,400 nonprofits was realized by the author. In addition, there are some studies focusing on transparency in Czech [3] [19] or Slovak Republic [10]. Despite mentioned efforts as well as recent positive changes in legislation going to increase of transparency, the Czech nonprofit sector suffers from a bad reputation in public.

### 2.2 Legislative requirements for organizational transparency in the Czech Republic

There was 103,533 nonprofit organizations recorded in the Czech Republic registers in 2017. These organization usually have the legal form of association (90.5 %), church entity (4 %), public beneficial organization (2.7 %), foundations and endowment funds (2.1 %) and constituencies (0.7 %) [12]. In the Czech Republic the obligation to publish information on NPOs is introduced from 2016, mainly according to new Civil Code and Act on Accountancy. Unlike for example Germany where no public disclosure requirements for privately controlled charitable organizations exist [17]. Since the beginning of 2014, the Civil Code introduced the obligation to publish financial statements and the annual report for foundations, endowment funds, public beneficial organizations, and constituencies. However, from 1. 1. 2016, the Act on Accounting provides an obligation to publish the financial statements and the annual report for all entities registered in public registers. [14]

## 3 Material and methods

### 3.1 Research method and data gathering

For organizational transparency identification was used a construct inspired by previous study of author [2] and one other study [9]. It is important to note that this construct is developed as the very minimum which transparent NPO should present about itself. Data were gathered in the period of Jan. 9, 2018 to Jan. 18, 2018 with use of public registers and content analysis of organizational websites. Table 1 points out basic examined areas of transparency, and also should briefly present the reason why these areas are crucial for organizational transparency.

**Table 1. Description of construct of online transparency and methods of data collection. (Source: Author)**

Area	Important Transparency Aspects	Method of Data Collection
Web existence	Website enables 24/7 transparency of the organization to all the public	Internet browsers Mozilla Firefox and Google Chrome, organization's name used as a key word.
Principal organizational documents	Statutes are the basic organizational document as it outlines organizational direction, bodies, rules and control mechanisms in accordance to legislation. Annual Reports are crucial with regards to mapping the nature, type and amount of activities conducted in a given	Public registers, in case of church organizations a content analysis of websites.

	year. Only reports for years 2015 or 2016 were searched.	
Strategic statements	Existence and clarity of strategic declarations as: mission, vision and values. These statements should enable not only definition of future objectives, but also a some level of its achievement	Content analysis of website and/or organizational document available online; analysis of individual strategic declarations.
Financial transparency	Access to financial statements as balance-sheet and income and loss statement.	Public registers.

### 3.2 Research sample

Sample for research consists of 28 NPOs supported from the government budget with amount exceeding 50 million CZK (approx. 2 mil Euro) in 2016. The research sample included mainly sport oriented organization (57 %), than organizations providing social services (18 %), organizations in education and science (14 %), and organizations with other focus (11%). The list of all organizations with more details on funding is included in Table 2.

**Table 2. NPOs as recipients of more than 50 millions CZK subsidies from government budget in 2016 (Source: The Office of the Government of the Czech Republic [21])**

Name of the recipient of subsidies <sup>1</sup> (N=28)	Sum of subsidies (in thousands €)	Number of subsidies	Funding for one subsidy (in thousands €)
Football Association of the CR	14,742	9	1,638
CESNET, association of legal persons	10,857	7	1,551
People in Need, o.p.s.	6,564	93	71
Mountain Rescue Service, CR., o.p.s.	5,883	4	1,471
Diocesan Charity Brno	5,850	154	38
Silesian Diacony	5,380	111	48
Czech Athletic Union	4,945	9	549
NADĚJE	4,929	87	57
Czech Olympic Committee	4,788	6	798
Czech Union of Sport, z.s.	4,300	4	1,075
Salvation Army in the CR, z.s.	3,903	64	61
Czech Association of Ice Hockey, z.s.	3,822	8	478
Autoclub of the CR	3,407	10	341
Technology Center of the AS of the CR	3,377	9	375
Czech Sokol Community	3,357	8	420
Czech Basketball Federation, z.s.	3,227	7	461
Czech Tennis Association z.s.	3,195	8	399
National Olympic Center of Water Sports, z.s.	3,137	1	3,137
Skiers' Association of the Czech Republic z.s.	2,758	9	306
Charity of the Czech Republic	2,755	31	89
Episcopal grammar school of J.N. Neumann..	2,623	11	239
Czech Volleyball Association	2,600	7	371
Czech Cycling Association z.s.	2,420	7	346
Association for GP CR Brno	2,353	1	2,353
Czech Union of Martial Arts z.s.	2,306	6	384
Czech Catholic Charity	2,271	14	162
Czech Association of Canoeists, z.s.	2,123	5	425
Episcopal grammar school Brno..	2,049	4	512

<sup>1</sup> In some cases there were not official English organization' name available

## 4 Results

Football Association of the Czech Republic holds an exceptional position among all the recipients from the governmental budget. In 2016, this football association received almost €15 million, slightly lower funding was in 2015 (€12 millions) and in 2014 (€13 millions). There are other five organizations receiving over €5 million from the governmental budget: CESNET (€11 million), which is an organization ensuring IT infrastructure for Czech science, research, development and education; People in Need (€6.5 million) with the large focus ranging from international humanitarian aid via promotion of civil society up to social services. Other three organizations have clear focus expressed in their name: Mountain rescue service (€5.9 million); Diocesan Charity Brno (€5.8 million); and Silesian Diacony (€5.4 million).

### 4.1 Administrative difficulty in obtaining of governmental funding

Administrative difficulty were considered with focus on two aspects of transparency: legal form as an assumption for minimal level of transparency determined in legislation, and number of projects necessary for obtaining the governmental funding. Regarding the *legal form*, the majority of organizations in the sample possessed the legal form of association (18 out of 28; 64 %), which is the most simple form demanding the least of requirements on transparency as well as on self-control mechanisms in the organization itself. In the rest of organizations, the six church organizations (21 %), two public beneficial organizations (7%), and two organizations (7 %) in a legal form of association of legal entities are included. The last legal form is very similar to the form of association and have same requirements on the level of transparency. Regarding the *number of projects* made per year there were significant differences among the organizations found. The highest differences were recorded in sport organizations where average amount of money per project reached €843 thousand while and on the contrary in organizations providing social services it was €59 thousand only. Two organizations are exceptional ones as they have received all the funding in one project worked out only. Interestingly, one of them, National Olympic Centre of Water Sports have not published any information publicly except statutes and it has not even established its website. Detailed analysis of governmental subsidies according to their orientation and legal form is included in Table 3.

**Table 3. Analysis of governmental subsidies according to organizational aspects (Source: Author)**

Researched Area (N=28)	Number of organization in the sample	Amount of funding (%) of the sample)	Average subsidy (in thousands EUR) per project
<i>Organizational Orientation</i>			
Sport	16	52.9	843
Social Services	5	19.0	59
Education	4	15.8	669
Other	3	12.3	568
<i>Legal Form</i>			
Association	18	60.3	755
Church Organization	6	17.5	181
Association of legal entities	2	11.9	771
Public Beneficial Organiz.	2	10.3	770
<i>In Total</i>	28	100.0	x

### 4.2 Organizational website

*Websites* were found available in majority of organizations (93 %) analyzed. Two organization without own website were National Olympic Centre of Water Sports and Association for Grand Prix of the Czech Republic. First organization aims on construction of water sport facilities and water sport itself, the latter organization aims on international

motorcycle races held once a year in Brno. Regarding the quality of websites found, the organizations with websites embrace sufficient facts on their organizational activities, organization itself or many references on member's organization. Exceptional is Czech Catholic Charity with very simple web with no documents and almost no information published.

#### 4.3 *Principal organizational documents*

*Statutes* were found in three quarters of NPOs (75 %). Mainly, there were church NPOs among NPOs with statutes published (5 out of 7) on their websites. Nevertheless church NPOs are not obliged to publish their statutes according to the current Czech legislation. It is also important to notice that in case of church NPOs the statutes were searched only on their websites as the church public register does not collect such documents. On the other hand, the other two NPOs (Technology Centre of Academy of Science of the Czech Republic and Czech Association of Cycling) have not the statutes published in public registers even the law imposes such obligation to them.

*Annual report* in public registers have published only 13 out of 28 NPOs (46.4 %). Repeatedly, the results showed significantly lower level of availability in sport NPOs (5 out of 16 with available report, 31.3 %). For example, the Football Association of the Czech Republic, the recipients of the highest governmental funding, have not its annual report published in the public register. In addition, complete annual report is not available neither on the website, this NPO publishes only activity report on passed football season in the form of a bulletin issued for general assembly meeting. Very low level of transparency in this case was recorded also in case of NPOs providing education (1 out of 4 NPOs published its annual report). On the contrary, annual reports in NPOs with social service orientation have been published by 4 out of 5 NPOs (80 %).

#### 4.4 *Strategic management statements*

*Strategic declarations and its clarity.* There were four types of strategic statements included in research: mission, vision, values and ethical code of conduct. Most NPOs have available their mission statement. In major, the results varied according to organizational focus. Sport oriented NPOs have usually placed this mission only in the statutes and not available as a part of website. NPOs with focus on social services provision have had usually missions presented directly on the website. These NPOs also have worked out an ethical code of conduct. In general, only three organizations from the sample worked with vision and two of them used values. Strategic declarations were much more frequently worked out in organizations with focus on social services provision, as it is obvious from Table 4. While sport organizations have typically made up a mission statement, other organizations have worked out at least two statements (most frequently mission and ethical code of conduct). Qualitative analysis of the content of individual mission and its clarity showed that NPOs do not understand the function of mission in the same way as it is outlined in the management literature. All researched organizations rather have formulated these statements rather as a description of activities, thus question 'what we do?', instead of theoretical proper justification of their activities and answering the question 'why we exist?'

#### 4.5 *Financial transparency*

Financial statements as balance sheet and income and loss sheet are the main statement to be published in public registers. Moreover, some organizations are obliged to publish external accountant audit. In general, 13 out of 28 organizations (46.4 %) published both up-to-date financial statement and audit. Other 7 NPOs published either financial statement or an audit. Finally, the rest of 8 organizations (28.6 %) have not published financial statements and audit neither. Interestingly, on the basis of investigation of financial statement, was found that Episcopal grammar school of J.N. Neumann and Ecclesiastical Primary School used all funding

for covering their operational costs, which can support doubts on systematic way of allocation of governmental funding.

## 5 Discussion and conclusions

Transparency of NPOs was researched in the areas outlined above. Overall results on transparency of NPOs are summed up in the Table 4.

**Table 4. Transparency of NPOs with governmental subsidies exceeding 50 mio CZK in 2016 (Source: Author)**

Name of organization (N=28)	Web existence	Statutes	Annual Report	Strategic declarations <sup>1</sup>	Financial statements and audit <sup>2</sup>
Football Association of the CR	•	•	x	•	☒ •
CESNET, association of legal persons	•	•	x	••	••
People in Need, o.p.s.	•	•	•	•••	••
Mountain Rescue Service, CR, o.p.s.	•	•	•	•	••
Diocesan Charity Brno	•	x	•	•••	••
Silesian Diacony	•	x	•	•••	••
Czech Athletic Union	•	•	•	•	••
NADĚJE	•	•	•	•••	••
Czech Olympic Committee	•	•	x	•	••
Czech Union of Sport, z.s.	•	•	•	•	••
Salvation Army in the CR, z.s.	•	•	x	••	••
Czech Association of Ice Hockey, z.s.	•	•	•	•	••
Autoclub of the CR	•	•	x	•	x☒
Technology Center of the AS of the CR	•	x	x	••	xx
Czech Sokol Community	•	•	•	••	•x
Czech Basketball Federation, z.s.	•	•	x	•	•☒
Czech Tennis Association z.s.	•	•	x	•	xx
National Olympic Center of Water Sports, z.s.	x	•	x	x	xx
Skiers' Association of the CR z.s.	•	•	x	•••	•x
Charity of the CR	•	x	•	•••	••
Episcopal grammar school of J.N. Neumann..	•	x	•	x	xx
Czech Volleyball Association	•	•	x	•	xx
Czech Cycling Association z.s.	•	•	•	x	••
Association for GP ČR Brno	x	•	x	x	•x
Czech Union of Martial Arts z.s.	•	•	x	x	•x
Czech Catholic Charity	•	x	x	••	xx
Czech Association of Canoeists, z.s.	•	•	•	•	•x
Episcopal grammar school Brno..	•	•	☒	•	xx

Notes:

• available, x not available, ☒ available, but old version, BG Biskupské gymnázium

<sup>1</sup> Each dot represents strategic declarations as mission, vision, values and/or ethical code

<sup>2</sup> Each dot represents documents as financial statements, and/or accounting audit

Analysis of funding allocation and the content analysis on organizational transparency showed following facts:

1. In structure of most generously funded NPOs are mainly present sport oriented organizations: represented by highest number of organizations and biggest amount of funding allocated. Controversially, these highest recipients of funding report the worst levels of transparency and they even violate legislative regulations. On the contrary, the NPOs providing social services report much higher level of transparency.
2. Besides of aforementioned, the sport NPOs receive its funding with spending of much lower administrative effort than other organizations. Vice versa, the social service organizations have to produce multiple project administrative effort to obtain the same level of funding as organizations with sport or education orientation.
3. Transparency result on the side of sport NPOs is supported by case study of Transparency International on National Olympic Centre of Water Sport which provides evidences on not transparent and not systematic funding as well as on personal interconnections with other sport organization (Czech Olympic Committee) [20].

4. The legal form of association which makes almost two thirds (64 %) of most generously funded organizations demand the least legal requirements on transparency.
5. Strategic direction of NPOs examined is rather short-term oriented (focus on activities) than long-term oriented (focus on benefit to society and justification of organizational existence).
6. In general, the majority of researched NPOs have not meet minimal moral neither legal standards of transparency.

Findings showed that organizations with a large favor on the side of government do not fulfil even basic requirements for its transparency and accountability. Such level of accountability does not comply with Ebrahim's approach of upward accountability where organizations are responsible mainly to donors and governments [6, 7]. For the next research, the topic itself, especially its application in nonprofit sector offers a lot of possibilities. Questions like following and others should be addressed: Why only sport and social services are supported so much? Where are the cultural, educational, or environmental organizations? What about conflict of interests among representatives of NPOs? What is an effectiveness of use of state funding? How the government measure return on money invested to nonprofits? Longitudinal approach to this research would also bring better understanding of the problem.

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# New Health Technologies as One of Key Drivers of Healthcare Spending Growth in the Czech Republic

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## Abstract

The paper deals with the impact of the expansion of new health technologies on healthcare spending growth in the Czech Republic. This factor is often mentioned by OECD as one of the main drivers of public health expenditures with ageing and death-related costs, rising incomes, low productivity and others. The aim of contribution is to evaluate development of health expenditures spent on items clearly linked to technological progress in healthcare - medical devices, pharmaceuticals and especially medicinal products in specialized centres. Detailed analysis is done for period 2010 to 2016, when all variables were reported in the statements of Czech health insurance companies (this also reflects the significance of the observed question in Czech healthcare economics). The importance of pharmaceuticals and medical devices in healthcare financing is monitored in longer time between years 2000 and 2016. Based on the analysis as drivers were verified medical devices and especially medicinal products in specialized centres. This claim was not confirmed in the case of pharmaceuticals.

*Keywords: new technologies; healthcare; public expenditures; pharmaceuticals*

JEL Classification: H51, I18

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## 1 Introduction

Healthcare sector represents an important component of public services in all developed countries. There are many indicators for comparing its significance in national economies. In the OECD members the share of healthcare expenditures on gross domestic product was between the years 2000 - 2016 on average about 8.3 %, in the Czech Republic it was 6.7 % [17]. Other popular evidence is COFOG, that represents distribution of the government sector's expenditures according to function. In year 2015 health expenditures were in the Czech Republic the second largest (18 %) of all behind social issues (30 %) and before economic affairs (16 %) and education (12 %) [9]. At our post-crisis and maybe in the future again crisis period it is necessary to analyse factors affecting current development of public expenditures and looking for their causes and possible solutions to problems before it is too late.

There are many theories explaining reasons for the growth of public spending. One of the most known is "Baumol's cost disease", that based on comparison of public and private institution's productivity, describes the aim about rising costs per unit of public sector output value due to wage growth [3] [11] [16]. However there can be a lot more causes - population and technological changes, fiscal illusion (voters do not associate their levy with the provided public goods), inflation, demonstration effect (voters compare the standard of living and the level of public spending with other countries and call for convergence), Wagner's law (the share of public spending on GDP is growing with the rise in per capita income), Peacock - Wiseman's threshold effect theory (in the case of negative economic development taxpayers are willing to accept tax increases, but after the end of the unfavorable conditions public spending will not return to the original level) and welfare state theory (the government is trying to provide citizens with a certain living standard, no matter what their income is) [2].

Healthcare market has very specific structure, so the question, whether the factors influencing the growth of health expenditures are like those used in the general treatise on all public finances, arises. This market structure is interesting for its nature of demand, doctor's behaviour, uncertain health product, legislatively regulated supply and price formation process [1]. These fundamentals are the same until today [10] [15].

For health expenditures scientific studies indicate as the main causes of growth demographical changes, new health technologies, rising incomes and various institutional characteristics of health systems. Demographical conditions highly influence spending especially by population ageing, because elderly people have often chronic diseases with multiple morbidities. Other aspect is also longer life expectancy. Rising incomes can be one driver too as people with rising of their incomes expect healthcare services with higher quality and bigger scope of them. Each healthcare system is somehow unique as a cause by other population and institutional characteristics (reimbursement mechanisms, used system of primary and long-term care, legislation) [7] [18].

The importance of new health technologies is not ignored but the impact on the expenditures is not clear especially because of possible savings while healing the illnesses in more complex way. These technologies allow new possibilities for diseases that were not previously treatable. On the other hand, they are frequently a lot more expensive than basic procedures. The designation of new technologies as a factor in the growth of healthcare spending is associated with a number of problems [20]. OECD mentions two options, how the impact of this is being analysed – as the residual to other considered factors (ageing, rising incomes etc.) or by microsimulation models of patient's behavior [4]. In some scientific papers is a technological factor considered as the major factor in healthcare spending growth at out time [5] [20]. Nevertheless, one of the last papers on this topic notes: "The introduction of new technologies is likely to increase health spending. However, its impacts are often difficult to model, because of unclear function of certain variables, computational complexity, or lack of data." [12].

Other interesting aspect of new health technologies is also their heterogeneity and relationship of these groups to effectiveness. Some of them are technologies with high value as process innovations (wound sterilisation) low cost and high effective methods (vaccines, preventive interventions) or highly effective high cost methods with clear target population (some kinds of cancer preventive activities). To the next group belong effective technologies, which are not suitable for all patients (broad using is not beneficial). The last ones are the low value technologies with little evidence of their effectiveness (e.g. robot surgeries for some diseases) [6]. Knowledge of healthcare drivers is one of the essential steps towards higher efficiency of healthcare system [19].

As it is just an initial analysis the aim of this paper is to evaluate development of health expenditures spent on items clearly linked to technological progress in the Czech Republic - medical devices, pharmaceuticals and medicinal products in specialized centres. These three groups are set by law and regulated in other ways, their differences are briefly explained.

Medical device means a device, apparatus or software designated by its manufacturer for a specific use for diagnostic or medical purposes, mainly for diagnosis, prevention, monitoring, treatment or alleviation of the disease. Medical devices do not achieve their principal intended function in the human body or on its surface by a pharmacological, immunological or metabolic effect [26].

Pharmaceuticals are defined as substance or combination of substances presented with therapeutic or prophylactic properties in the case of human or animal diseases or used to restore, modify or affect physiological functions by pharmacological, immunological or metabolic effect or to find a medical diagnosis [28].

Medicinal products in specialized centres are those whose reimbursement from public health insurance is possible only in some specialized centres (the health insurance company can cover these products to a provider with a special contract) [25]. Criteria and procedures for assessing a highly innovative product are following - the comparability of the effect on the treatment of a very serious disease treatable by another therapy with serious negative effects on most patients, the emergence of serious drug interactions on most patients or disease is characterized by frequent development of serious complications on most patients. Innovative is of course the medicine to treat a severe illness that has not yet been affected by effective therapy. These procedures are often related to experimental approaches, including therapy for highly serious illnesses for which there is not yet sufficient data on cost-effectiveness or

treatment outcomes when used in clinical practice [22]. Medicinal products in specialized centres are indicated for the most serious chronic diseases as cancer, multiple sclerosis, metabolic disorders, rheumatological disease or Crohn's disease [24].

## 2 Material and Methods

Data were obtained from the statements of Czech health insurance companies, concretely from evaluations of their annual reports made by Ministry of Health and Ministry of Finance of the Czech Republic in the period 2000 to 2016 [14]. This evaluation is carried out regularly every year and is submitted by legislation [27] [29]. The advantage of this approach is the same method used for data processing also according to applied legislative rules by mentioned ministries [23].

The analysis was done for period 2010 to 2016 for all chosen variables. Longer time series (2000 – 2016) are available just for pharmaceuticals and medical devices. This fact also reflects the significance of the medicinal products in specialized centres in Czech healthcare economics from the year 2010 (this category is separately reported since that time). It is not suitable to draw conclusions only on 7 observations for medicinal products in specialized centres, so additionally are used quarterly statements of health insurance companies [13]. These reports are processed under the same legislation as annual ones [21] but need to be modified due to problem with stock and flow quantities and this source includes preliminary data.

Namely from the statements of health insurance companies were used tables: "Cost Structure of Health Services by Individual Segments" of which these variables: total healthcare costs drawn from Section A of the basic health insurance fund, medicinal products paid only to providers in specialized centres, prescript pharmaceuticals, medical devices issued on vouchers.

If focusing briefly on health insurance companies reporting, it can be summarised, that they are obliged to have two kinds of statements – one based on cost reporting (accrual method) and the second one based on financial flows (expenditures reporting - cash method). In the public sector is mostly used expenditures reporting, but this is not detailed enough for this paper. The analysis must be done based on the accrual concept because of more extensive dataset.

Data were in some samples also inflation-adjusted into real values. For this was used quarterly and annual inflation data about Consumer Price Index (CPI) from the Czech National Bank database ARAD [8]. Ignoring the impact of inflation might have a negative impact on the validity of the obtained results. All analysed time series are included in the table.

**Table 1. Overview of Time Series in Analysis (Source: Author)**

Symbol	Variable	Period	Periodicity	Data
MD-Y-N	Medical devices	2000 - 2016	Annual	Nominal
MD-Q-N	Medical devices	2010 - 2016	Quarterly	Nominal
MD-Y-R	Medical devices	2000 - 2016	Annual	Real
MD-Q-R	Medical devices	2010 - 2016	Quarterly	Real
PH-Y-N	Pharmaceuticals	2000 - 2016	Annual	Nominal
PH-Q-N	Pharmaceuticals	2010 - 2016	Quarterly	Nominal
PH-Y-R	Pharmaceuticals	2000 - 2016	Annual	Real
PH-Q-R	Pharmaceuticals	2010 - 2016	Quarterly	Real
SC-Y-N	Specialized centres	2010 - 2016	Annual	Nominal
SC-Q-N	Specialized centres	2010 - 2016	Quarterly	Nominal
SC-Y-R	Specialized centres	2010 - 2016	Annual	Real
SC-Q-R	Specialized centres	2010 - 2016	Quarterly	Real

The choice of methods is influenced by the fact, that this paper is the first analysis to the topic. It is mainly done for understanding the interrelationships and for identification of the appropriate variables for the future econometric analysis, so just basic descriptive statistical methods are used. Many related facts are difficult to analyse, but undoubtedly have an impact on the development of innovative technologies in healthcare (e.g. the increase in spending may be affected by changes in legislation or by macroeconomic conditions).

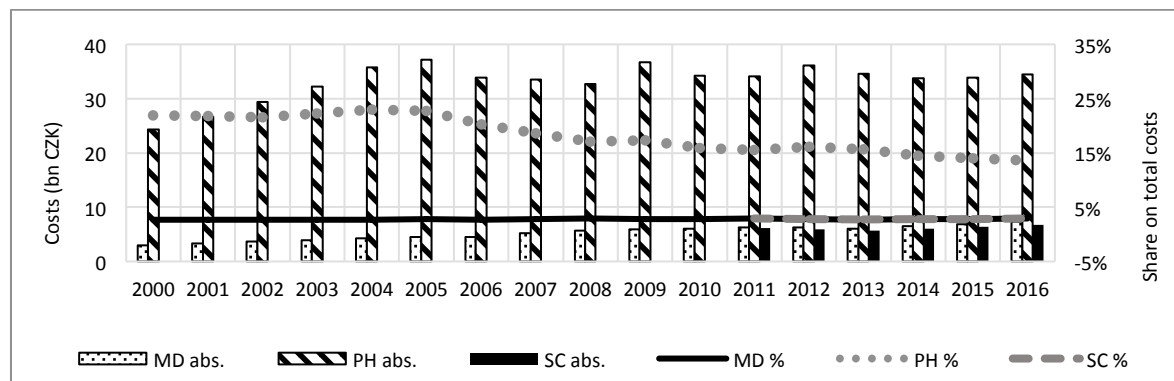
### 3 Results and Discussion

To verify whether new health technologies can be considered as one of the public health spending drivers, their growth is compared with the development of total healthcare costs. The analysis is done as comparison of time series of chosen variables with different time period, periodicity and (no)considering the impact of inflation.

#### 3.1 Comparison of Annual Time Series based on Nominal Data

Figure 1 compares selected categories and their significance on total costs. We can conclude that development of these variables is not the same, if we consider both indicators. During chosen period absolute spent amount on medical devices (MD) had more than doubled, but the share on total healthcare costs was nearly the same. Other development is visible while analysing pharmaceuticals (PH) – as all other categories absolute costs grew, but their share declined. Thirdly, both indicators of specialized centres (SC) had increased, but in this case more absolute than share indicator.

Figure 1. New Health Technologies Annual Nominal Data (Source: Author)



It is necessary to analyse dynamics of cost development year-on-year throughout the time. Table No 2 is done as comparison of chosen categories (MD, PH, SC) with total costs (TC). The highest dynamics relates to medicinal products in specialized centres. Achieved average change is a lot higher than in a case of total healthcare costs (more than three times). Average change of medical devices exceeded average change of total costs too. Due to this they can be considered as one of key drivers of healthcare costs, but this statement needs to be more verified.

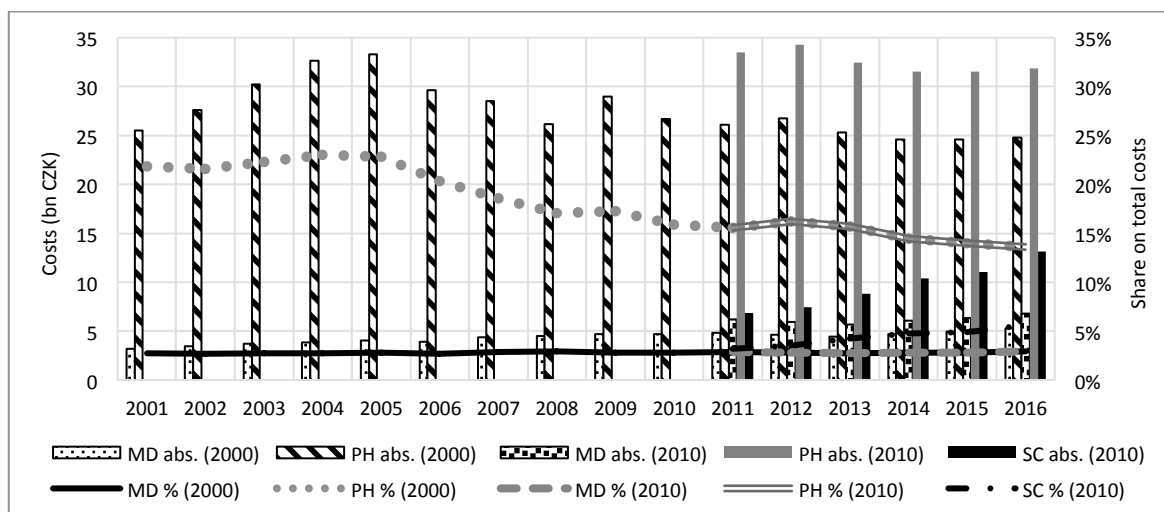
Table 2. Annual Nominal Data Year-on-year Dynamics (in %) (Source: Author)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	AV
<b>MD</b>	7.9	10.2	10.1	8.4	6.8	7.2	-0.8	14.9	9.2	5.8	0.4	5.0	-1.2	-2.6	6.9	5.2	7.8	<b>5.9</b>
<b>PH</b>	0.4	9.9	10.2	9.6	10.9	3.9	-8.7	-1.1	-2.4	12.0	-6.6	-0.3	5.8	-4.1	-2.4	0.2	1.7	<b>2.3</b>
<b>SC</b>	-	-	-	-	-	-	-	-	-	-	-	16.5	12.5	19.6	18.2	6.4	19.9	<b>15.5</b>
<b>TC</b>	3.2	10.3	11.4	6.1	7.5	4.9	2.4	8.1	6.3	10.5	1.5	1.8	1.8	-1.1	6.0	3.4	4.7	<b>5.2</b>

### 3.2 Comparison of Annual Time Series based on Real Data

The second part focuses on annual time series based on real data and changing the valuation (2000 and 2010) for calculation of the inflation impact. Values of all share indicators are the same (variables and total costs are modified by the equal inflation indicator, so the effect is eliminated).

Figure 2. New Health Technologies Annual Real Data (Source: Author)



From the previous figure we get similar information as from the one with nominal data. Cost categories grew in absolute way. The share of costs spent on medical devices was almost the same during the whole period. Other variance was in case of the rest possibilities, but the same as with nominal values – costs spent on pharmaceuticals decreased and on specialized centres increased.

Results included in the table No 3 show quite significant reduction in comparison with table No 2. From this table we get again the notion about higher year-on-year change in the case of medical devices and specialized centres in comparison with total costs, so both can be considered as cost drivers.

Table 3. Annual Real Data Year-on-year Dynamics (in %) (Source: Author)

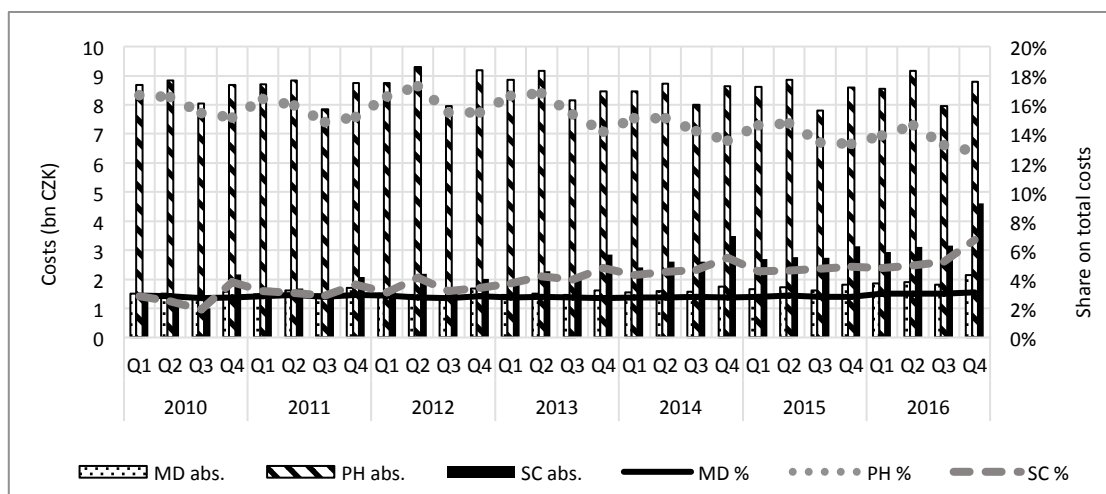
Valuation Year 2000																	
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	AV
<b>MD</b>	5.3	8.1	8.3	3.8	5.2	-3.3	11.8	2.7	4.8	-1.0	3.0	-4.4	-3.9	6.5	4.9	7.0	<b>3.7</b>
<b>PH</b>	5.0	8.3	9.5	7.9	2.0	-10.9	-3.8	-8.2	10.9	-8.0	-2.2	2.4	-5.4	-2.7	-0.1	1.0	<b>0.3</b>
<b>TC</b>	5.4	9.4	6.0	4.5	2.9	-0.1	5.2	0.0	9.4	0.0	-0.1	-1.5	-2.4	5.6	3.1	4.0	<b>3.2</b>
Valuation Year 2010																	
<b>MD</b>	-	-	-	-	-	-	-	-	-	-	3.0	-4.4	-3.9	6.5	4.9	7.0	<b>2.2</b>
<b>PH</b>	-	-	-	-	-	-	-	-	-	-	-2.2	2.4	-5.4	-2.7	-0.1	1.0	<b>-1.2</b>
<b>SC</b>	-	-	-	-	-	-	-	-	-	-	14.4	8.9	18.0	17.7	6.1	19.0	<b>14.0</b>
<b>TC</b>	-	-	-	-	-	-	-	-	-	-	-0.1	-1.5	-2.4	5.6	3.1	4.0	<b>1.5</b>

### 3.3 Comparison of Quarterly Time Series based on Nominal Data

The aim of last two parts is to verify the previously obtained results on another dataset with higher frequency. These sections are very important for the future planned econometric analysis due to specifics of time series testing with other frequencies. It is always recommended to have as explanatory and explained variables ones with the same frequency. On the other hand, for chosen research problem there are insufficiently long annual time series, so dilemma

how to increase the validity of results appears. All these conditions affect the choice of future explanatory variables (not all of them can be obtainable with the same frequency).

**Figure 3. New Health Technologies Quarterly Nominal Data (Source: Author)**



As we have shorter period than one year as in this case, the problem of seasonality in the time series is expectable. Figure No 3 can be the evidence of this. Medical devices indicator achieved the highest absolute value in the last quarter, the share of these costs was constant (same as in samples with annual data). Similar development was observed (i.e. the highest absolute value in the last quarter) at specialized centres, but the share indicator grew slightly. On contrary the remaining one (pharmaceuticals) reached the highest value ever in the second quarter of the year and it is not possible to trace the growing or decreasing trend in the share indicator.

Due to specifics of analysed series we have given just the summary containing the maximal, minimal and average values of month-to-month changes. In the first part (“nominal”) we get the same conclusion in expenditures drivers identification, but the analysis of this problem is quite complicated because of many factors affecting total costs. It is not possible to draw simply conclusions about the link with new health technologies with such fluctuating indicators (average changes of all variables are significantly different).

**Table 4. Quarterly Data Dynamics (in %) – Summary (Source: Author)**

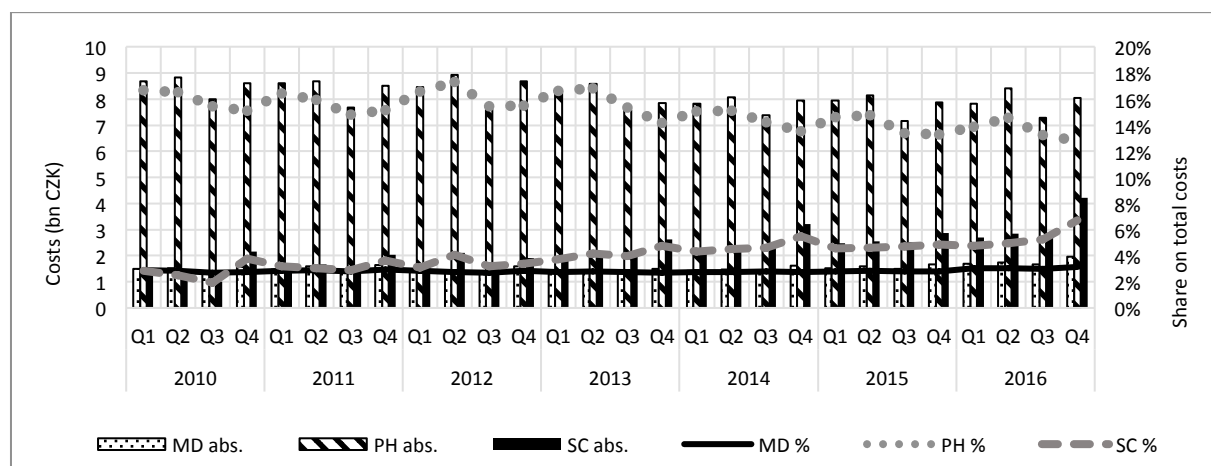
	Nominal			Real		
	MAX	MIN	AV	MAX	MIN	AV
<b>MD</b>	20.43	-12.83	<b>1.72</b>	19.44	-13.43	<b>1.39</b>
<b>PH</b>	15.45	-14.38	<b>0.38</b>	14.50	-15.06	<b>0.05</b>
<b>SC</b>	116.19	-25.57	<b>7.60</b>	115.38	-26.16	<b>7.24</b>
<b>TC</b>	15.34	-10.28	<b>1.30</b>	14.39	-10.90	<b>0.96</b>

### 3.4 Comparison of Quarterly Time Series based on Real Data

The importance of this section comes out for findings about the new technologies as one of key drivers of healthcare spending growth of course, because it is necessary to separate at least inflationary and other factors.

Using inflation-adjusted data we got expected differences in calculated values – lower absolute and share indicators. Conclusions from this part are the same as previously stated. To sum up results are stated in table above for better comparison (“real”). For our task are the most appropriate average variables, whose values again prove that as healthcare spending growth drivers in the Czech Republic can be considered medical devices and specialized centres.

Figure 4. New Health Technologies Quarterly Real Data (Source: Author)



## 4 Conclusion

Fiscal sustainability of healthcare financing is nowadays question, especially what to do, whether the system needs more resources or if there is a possibility to do activities more efficiently. Inhabitants gain today ever-improving medical procedures, live longer and so spend more services. It is necessary for responsible healthcare management to analyse causes of permanent healthcare spending growth. One of given reason is the impact of the expansion of new health technologies. These technologies are clearly linked to medical devices, pharmaceuticals and medicinal products in specialized centres. Based on the analysis as drivers were verified medical devices and especially medicinal products in specialized centres. This claim was not confirmed in the case of pharmaceuticals. Lower costs of them can be caused by substitution of generic pharmaceuticals in last years. Thus, for Czech healthcare policy makers is emerging a need for deeper regulation, especially increasing use of HTA evaluation, that is largely underdeveloped.

It would be interesting in the future research to formulate econometric model for impact detection of various input variables (e.g. demographical or financial). It is possible for getting larger data to include into model longer quarterly time series, but validity of this source can be limited due to the mergers of health insurance companies and related consolidations. In order to full explanation of the reasons for growth, it would be necessary to analyse legislation. This paper focuses just on macroeconomic variables, other research option can be use of per capita costs.

## Acknowledgements

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# Understanding Policy Failure and Policy Success: the Czech Republic Perspective

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## Abstract

This paper deals with evaluation of public policies, as well as the criteria upon which we can evaluate them as failing or successful. Such an analysis of a policy success and policy failure is not easy. In literature, we cannot find an established and unified definition of the above and only one approach to policy evaluation is not prevalent. Our viewpoint is based on two approaches to analysis of policy success and policy failure. We work on the theoretical assumption of two dimensions for the evaluation of policy success and policy failure - program and politics, by Mark Bovens and Paul 't Hart. Secondly, we based this article on the work of Allan McConnell and his presumption of three dimensions - process, program and politics. The goal of the paper is to explore and discover whether this theoretical background is sufficient with the aim to refine it (especially in the context of the Czech Republic). Our methodology approach is based on the above-mentioned theoretical bases and in-depth semi-structured interviews with Czech experts, policymakers and bureaucrats and their perception of policy failure or success.

*Keywords: policy failure; policy success; dimensions of policy failure and success; polity*

JEL Classification: D72, D78, H19

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## 1 Introduction

This article reports on an exploratory study of evaluation of public policies, and how we can evaluate that a policy is failing or successful. Our research is based on investigation of a specific policy (organizational reform of labor offices in the Czech Republic), which is considered to be a failure. [7, 5] This means that we focus primarily on policy failure but we assume, just like Allan McConnell [10, 11], that success and failure can occur at the same time. When the policy is failing in some aspect it can be successful in another dimension. Therefore, these two concepts - policy failure and policy success - should not be completely separated.

During the examination and evaluation of the organizational reform of labor offices, we found that evaluating the policy as successful or failing is not easy. Despite the fact that the topic of policy failure and success is relatively well-studied in the West, [e. g. 2, 10, 11, 6, 15] we have not found an established and unified definition of policy failure and policy success. The reason is that each policy is complex and unique and that culture in every society is different, goals of each policy are usually very complex, often conflicting or even contradictory; and each researcher has different ontological and epistemological assumptions, different value starting point and different theoretical background. [2, 6, 11]

Therefore, it is hard to evaluate and define the causes and dimensions of policy failure and success. The consequence may be that policy failure is persistent [6] and pervasive [11] because it is very hard to improve the process of decision-making and to avoid failures.

Apart from the fact that in literature we have not found an established and unified definition, causes and dimensions of policy failure and policy success, we have discovered that this topic is not covered in the Czech scholarship. Some of the Czech scholars evaluate the implementation of a policy [e. g. 12] but the implementation is just one stage (dimension) in the concept of policy failure and success.

Our theoretical viewpoint is based on two approaches to analysis of policy success and policy failure. Firstly, we build on the work of Mark Bovens and Paul 't Hart [2] who assume that the analysis of a policy includes two dimensions - program (which includes the method of implementation) and politics. Secondly, we based our work on the approach of Allan McConnell

and his presumption of three dimensions – process, program and politics. In our analysis, we consider this three-dimensional approach as more complex than the previous one, but we theorize whether this approach is sufficient or not.

The goal of this paper is therefore to explore and discover how practitioners perceive policy failure with a focus on individual dimensions. It was answered by the above-mentioned two main theoretical bases [2, 10 11] and by the in-depth semi-structured interviews with Czech experts, policymakers and bureaucrats. We assume, just like Adams, Colebatch and Walker [1] that there is substantial academic knowledge, as well as courses available in this field, but we need to conceptualize theories based on our respondents' understanding of policy practice.

### *1.1 The Case - Brief Overview of Organizational Reform of Labor Offices in the Czech Republic*

To meet our goal we have arranged in-depth semi-structure interviews with experts, policymakers and bureaucrats who have some experience, especially with the particular organizational reform of labor offices. The reform originated in 2011 and was extensive in nature and focused on two functions of labor offices. The first area focused on employment assistance, while the second area focused on non-insurance social benefits (particularly need-based payments and disability benefits).

This reform was considered to be a failure. The problems of this reform are related to the area of approval process and its implementation. The approval process is generally considered to have been too quick, non-standard and unprepared. Stakeholders complained that during the decision-making process, communication from management was lacking, the controlling legislation was poorly drafted, and the timing of the reform was ill-considered (during the worldwide financial crisis). The stakeholders disputed the contention by the proponents of the reform that it would lead to budgetary savings. Implementation problems included the dismissal of many employees resulting in a labor shortage in the offices, an untested and unworkable new integrated ICT system and inappropriate space in the offices [7, 5].

### *1.2 Mark Bovens and Paul t' Hart Approach to Policy Failure*

These authors focus on the analysis of policy failure (in their submission, policy fiasco). Policy fiasco 'is a negative event that is perceived by a socially and politically significant group of people in the community to be at least partially caused by avoidable and blameworthy failures of public policymakers.' [2] From this definition it is clear that their ontology and epistemology position is constructivism. According to them, it is important who evaluates, because each evaluator has different values, opinions, experience, information etc. Similarly, what one sees as success, the other can see it as failure.

They recommend evaluating a policy fiasco (failure) in four interrelated layers. The first layer should answer the question 'How bad is bad?'. It is related to evaluation of a specific policy failure and the goal is to examine how much damage has occurred. In this stage Bovens and 't Hart [2] focus on two dimensions – program and politics. For each dimension we should set criteria for policy evaluation. When analyzing the program dimension, we should take into account the way of defining and solving a problem, its implementation and the impact of a specific measures on the target group. The political dimension is defined as sufficient political support for a program and its subsequent implementation, but also as the acquisition of political legitimacy. They consider a policy may fail in one dimension, while it may succeed in another one.

The second layer of policy evaluation is related to identifying who or what is the cause of damage. The analysis consists of developing the negative event as the consequence of someone or something. In the third layer, the researcher explains the causes of policy failure. The goal of the fourth layer is the evaluation of agents' behavior and answers the question 'Who is to blame?' This stage has its foundation in the definition of policy fiasco and is based on the belief that we can look for the culprit if a failure could have been avoided.

### 1.3 Allan McConnell's Approach to Policy Failure

According to Allan McConnell [10, 11], policy failure and policy success concepts are based on evaluation of three dimensions – process, program and politics, and on degrees of failure and success. We can perceive it as a more comprehensive approach than the approaches of Bovens and 't Hart for two reasons. Firstly, McConnell added a third dimension - process category. He theorizes that process is a very important dimension, but 'often unacknowledged'. His assumption is that each public policy is created by policy decisions, which are made during a policy making process, 'focusing on factors ranging from problem definition and consultation to policy options appraisal and policy design.' [11] The other two dimensions are defined similarly to the approaches of Bovens and 't Hart. The programmatic dimension is characterized as implementation, achievement of desired outcomes and also covers benefits for relevant target groups. Political dimension is defined as achievement of intended political outcomes and sufficient political support, and political legitimacy with impacts including successful electoral reputation. As in the work of Bovens and 't Hart [2], each of the three dimensions have particular features and they are inextricably linked, but 'it is useful to separate them analytically because they draw on different traditions within the policy sciences and provide us with an understanding of different ways, in which a government may fail to do what is intended.' [11]

The second reason why his concept is more complex is that he theorizes that success and failure can occur at the same time. Success is not all or nothing. Failure can occur in some (not all) dimensions mentioned above but it can be also a matter of degree, as well as being interspersed with success. According to him, each dimension should be evaluated for a degree of failure and its relationship to success. He characterizes three levels (degrees) of failure (or success). These include a tolerable failure (= resilient success), conflicted failure (= conflicted success) and outright failure (= marginal success). [11]

Like Mark Bovens and Paul 't Hart [2], he acknowledges that the results are dependent on judgment but he simultaneously seeks to quantify the policy evaluation (if it is successful or failing). Both of these approaches are based on the assumption that the evaluator should explicitly introduce his research position, ontology, epistemology and value starting point.

## 2 Material and Methods

The goal of the paper is to explore and discover how experts perceive policy failure and whether the above-mentioned theoretical background is sufficient. If not, our next goal is to refine and reconceptualize existing literature relating to policy failure and policy success. The first approach to the investigation the goal is based on academic knowledge and our experience. It was answered by two main theoretical bases from Mark Bovens and Paul 't Hart and by Alan McConnel. In this research, three dimensions of policy success and policy failure are applied – process, program and politics.

In the second approach we used included in-depth semi-structured interviews with various relevant actors - Czech experts on public and social policy, policymakers and bureaucrats. The interviews are rather illustrative and their purpose was to explore and discover practical experience and perception of policy failure or success and, subsequently, to confirm or reconceptualize existing theories of policy failure and policy success. Their realm of interest was related to the reform of labor offices in the Czech Republic (i.e. opinions on the process of approving and implementing reform, successes and failures of the reform, and personal experience with the reform, always focused on the competence of the respondents). We carried out 13 interviews as listed in Table 1. Just like Adams, Colebatch and Walker [1], we make no claim that our respondents are a representative sample but only that their accounts of policy success and failure dimensions are worthy of attention and further examination. The questions were asked as part of semi-structured interviews in order to gain an insight into the reform of labor offices in the Czech Republic and to obtain opinions of practitioners and experts on typical policy success and failure.

**Table 1. A list of respondents (Source: Author)**

A list of respondents	Position of respondents
R1	Former Head of Employment Services Administration
R2	Former Minister of Ministry of Labor and Social Affairs
R3	Former Coalition Member of Parliament (policymaker)
R4	Former coalition Member of Parliament (policymaker)
R5	Expert on public and social policy
R6	Former bureaucrat and expert on public and social policy
R7	Former opposition Member of Parliament
R8	Expert on public and social policy
R9	Policymaker and expert on public and social policy
R10	Former Head of Labor office
R11	Former Deputy at the Ministry of Labor and Social Affairs
R12	Former employee of the General Labor Office
R13	Former employee of the General Labor Office

### 2.1 Analytical Procedure

In order to analyze the in-depth semi-structured interviews, we used thematic analysis, and just like Virginia Braun and Victoria Clarke [3], we consider it as a method, which should be driven by both our research question and our broader theoretical assumptions, and which is flexible and essentially independent of theory and epistemology. Simultaneously, we were inspired by some components of grounded theory [14]. Although the thematic analysis differs from grounded theory, the process of coding of data is similar.

Our analytical procedure was as follows: firstly, we transcribed data (interviews). Secondly, we read and re-read the data. We can call it active reading because it involved noting down our initial ideas. Thirdly, we carried out an open (initial) coding and found out important patterns (themes). This stage was an inductive process and deriving from it we got a sense of the important themes. Fourthly, we decided to select the coding and carried out a more detailed and nuanced account of one particular theme. Our thematic analysis started to be driven by a particular analytic question – Which features contribute to policy failure? We can say that this stage was realized using theoretical and deductive methods. We analyzed a lot of literature on policy failure and success theory and our analysis was inspired by our theoretical interest. From one part of this procedure we discovered a lot of codes (features) which contribute to policy failure. At this stage we thought about the relation between these codes and connected them with the concept of Allan McConnell [11] and his three dimensions of policy failure and success. In effect, we created three themes – process, program and politics – which include a lot of sub-themes. Simultaneously, we discovered a new specific theme, which has not been thoroughly investigated and explicitly defined yet. Therefore, our article analysis is mainly focused on this new theme, which helps us to redefine and reconceptualize the current theory of policy success and policy failure.

The whole analysis has not been a linear process. We did not move from one stage to the next. During our analytical procedure we went back to read the data and when we felt that we needed new information we scheduled additional interviews. We finished our interviews when we discovered a new important feature, which contributes to policy failure. And then we started to search similar sub-themes.

### 3 Results and Discussion – Reconceptualization of Policy Failure and Policy Success Theory

Based on our analytical procedure, we suggested that one could think about dimensions of policy success and policy failure in terms of the following themes: 1) process, 2) program, 3)

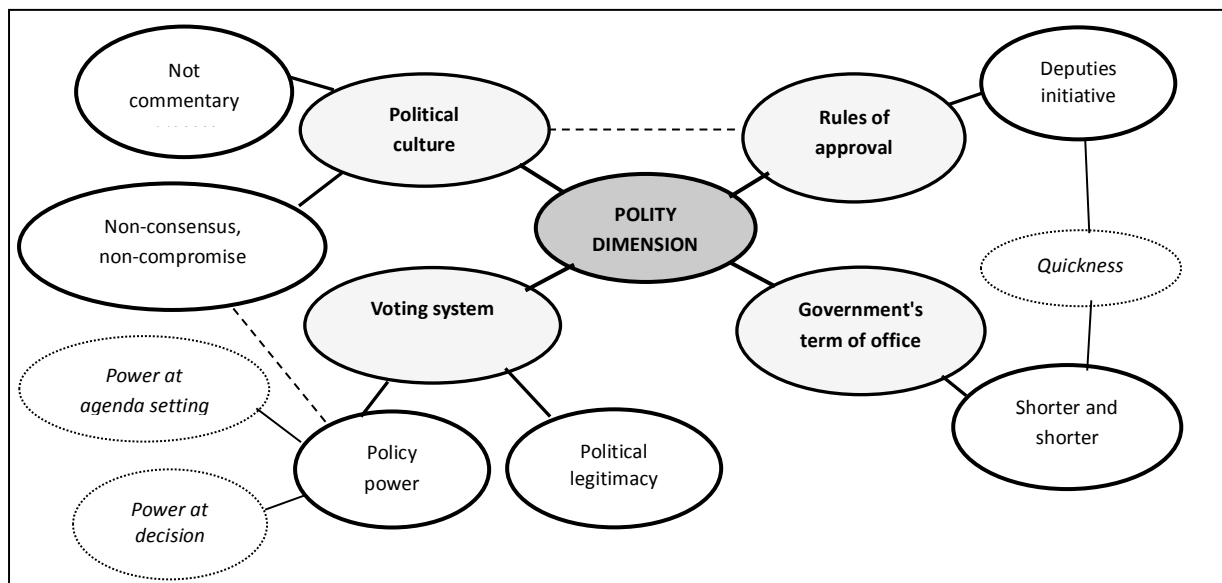
politics and new created theme 4) polity. These dimensions were derived from above-mentioned academic work on policy success and failure theory and from interviews with practitioners.

We have only briefly described the results of process, program and politics dimensions because we mainly concentrate on the fourth dimension - polity. *Process dimension* which is related to governments engages in processes that produce policy decisions. In relation to this dimension, we observed various statements, which were related to too quick, non-standard and unprepared approval processes with the absence of discussion and communication with stakeholders and experts. For example, 'There was only formal communication' (R7), 'The law was enforced hard, by power.' (R7), 'We had a very short meeting with Mr. Šiška ... He has wiped the floor with us. He arrogantly told us that the Minister has no time to deal with these things and that they have other ideas on how to follow the state employment policy.' (R1) 'Nobody really knew what was going to happen. It was absolutely unprepared, and people were confused.

*Program dimension* is applied to the method of defining and solving a problem, the method of implementation, achievement of desired outcomes and to benefit relevant target groups. Several respondents considered the idea to be good or that organization of labor offices should have been altered. For example, 'I just think the idea is good, but it just cannot be done like this.' (R11) 'We should evaluate a policy in relation to a target group, for example for better social services.' (R8) 'I think there was a problem with the setting of goals, not just achieving them.' (R5) 'I evaluate the idea of the reform as very good but the implementation as poor or even terrible.' (R4)

*Political dimension* is defined as sufficient political support, and political legitimacy with impacts including successful electoral reputation. We discovered few comments that feature the character of this dimension. However, the truth is that in the last election, the former government coalition did not receive enough votes and went into opposition. The former Minister of Labor and Social Affairs ended his political career. His statement in regards to this situation was as follows: 'My active participation in politics was not intended to develop into a life-long political career. I did not need to be in politics ... I knew that it would be unpopular.' Other themes that we found in the comments and which correspond with this dimension were about political clashes. For example, 'the government simply wanted to enforce the law at all costs for political reasons' (R11)

**Figure 1. Thematic analysis – the main theme Polity dimension of policy failure (Source: Authors)**



*Polity dimension*, as a new theme for the evaluation of public policies, is typically defined as political order and political setting, which is derived from interrelationships between three elements – politico-administrative institutions, societal processes and cultural adherences. [4] In general, we can consider polity to be the overall framework, in which policy is realized. In this

context we determined the following four sub-themes: political culture, rules of the approval process, (majoritarian) voting system, and the government's term of office, and more sub-sub-themes (e. g. policy power and political legitimacy) (see Figure 1).

*Political culture* is primarily meant to be a way of communication between political parties and method of voting in the adoption of laws. R9 pointed out the importance of political culture in the sense of communication and according to him *'where there is traditionally more developed political culture, there is a stronger hope for a successful public policy'*. R7 in this sense said: *'Democratically, I was given sufficient space to say what I wanted, but nobody took account of what I said. Because it had been written in the coalition agreement that no party could support any opposition proposal.'* Simultaneously, this respondent acknowledged that he/she voted against the law, because it was *'a right wing tool'*. We received a similar statement from R2 (former Minister of Labor and Social Affairs) who said: *'The lack of communication is not an argument for me, because the opposition is always against.'* R4 stated: *'The opposition was negative no matter what we said.'*

Political culture is also linked to the use of *rules of approval processes*. In the Czech Republic, according to the Constitution, a new law can be proposed by a deputy or a group of deputies, the government, regional officers and the senate. A new proposal can be made by a group of deputies and it can be defined as a simplified legislative process [9]. This means that the commentary process is pincer movement and such a proposal does not even reach the Legislative Council of the Government. Therefore, this method of approval is faster but non-standard for an extensive reform. We can say that politicians prefer it because they can avoid the communication with opposition political parties and members of the commentary process. R10 pointed out: *'A deputies initiative is always a plan B. If it does not work out like this (in relation to government proposals), several deputies are approached to reduce the length of time and they make a proposal on their own behalf. Of course, while working with ministers.'* This approach was confirmed by R3, R4 and R11, e. g. *'It was surely a matter of speed. Because the approval of government's proposal, of course, takes a considerably longer time. Anyone who knows something about politics knows that he has to work very fast to push something ahead.'* (R3) They also confirmed that the proposal *'prepared those who were ahead of us'* (that means ministers) (R4). Another similar statement is as follows: *'It was the deputies initiative, which, of course, arose evidently at the initiative of the Minister or at least with the minister's knowledge, as well as to speed up processes ...'* (R11)

Another important sub-theme is *the government's term of office*. In the Czech Republic, the election period is four years. But from 1990 to 2011 we had only two governments, which stayed in power for the whole period (for four years). This can also be related to political culture. According to politicians, the election period is too short to make fundamental changes. Several respondents (especially from the Parliament) pointed out this factor (R2, R3, R4 and R11). We have selected the following, e. g.: *'Politicians are pushed into this today, because we do not have a four-year term, the term is shorter and shorter, so if the government or the Minister want to do something realistically, they have two years to do so.'* (R11) as well as *'The election period is relatively short.'* (R3)

The voting system represents another sub-theme, in this case we mean the majoritarian voting system, which is related to some disadvantages and can lead to policy failure. It favors large parties and leads to their dominance. For a typical majoritarian voting system, the power is in the hands of few people. For example, when a strong coalition is created they feel greater *power* (over policy decisions or the setting of agenda). The power is connected with a government coalition and not with opposition. For example, when there is a strong government coalition (in the context of Czech Republic it has more than 101 votes), an approval process is easier for the government because they have greater certainty that their policy will be passed by the Parliament. Results can be related to the lack of communication, cooperation, consensus and compromise and it is obvious that it can influence policy-making processes and policy decisions.

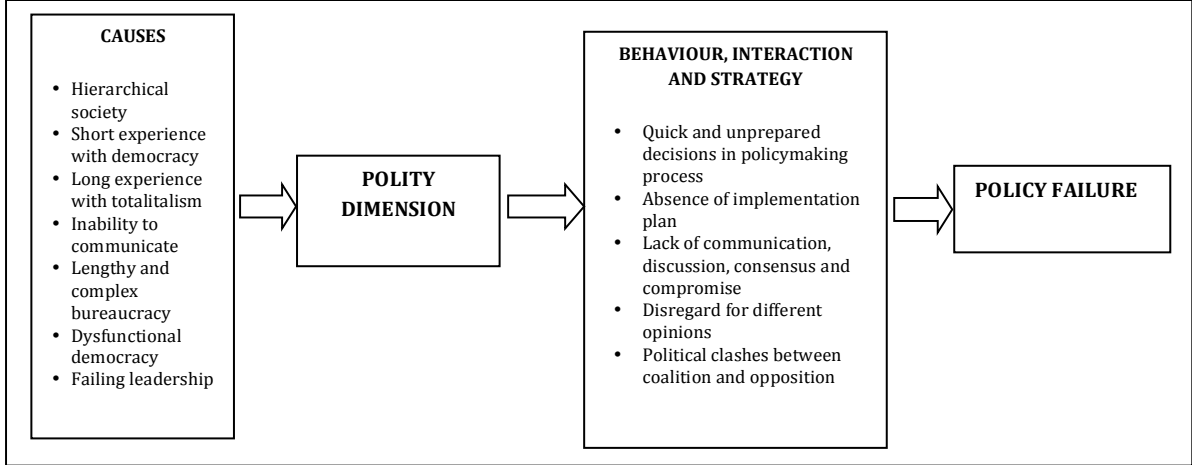
Greater power over policy decisions is obvious from this statement *'Yes, everyone can say what he wants, but the final decision is ours.'* (R7) or for example from this comment: *'Their arrogant government did not meet the agreement.'* (R10) Greater power over agenda setting was

observed on the basis of the statement: *'The law came very unexpectedly without consultation ... The method of informing was non-standard ... and it was intentional ... and the reason for it is that up until then they had experienced resistance following their proposed ideas.'* (R10). Or for example from this comment: *'The top official of the state administration was convinced that he was right, and he did not discuss the matter with anybody.'* (R9)

The majoritarian voting system in the Czech Republic is related to representative democracy. Voters elect their deputies to Parliament and those obtain *legitimacy* for policymaking. As R6 mentioned: *'and therefore they have the right to make the policy as they want.'* Again, in this respect, we sense the lack communication, discussion, cooperation, consensus and compromise.

To understand this theme in more detail, we created a simple polity dimension paradigm model (we were inspired by Strauss and Corbin). On this basis we are able to think more systematically and comprehensively. It means that we can find some regularity. Because of these reasons in the context of polity dimension, it is likely that the result (policy failure) may occur. We acknowledge that this model should be confirmed in the next research. There isn't enough space in this article for a deeper analysis - especially in terms of causes. The suggestion in Figure 2 is based on theories [e. g. 13, 8], other research (e. g. the Culture compass survey), brainstorming or life and personal experience.

**Figure 2. Polity dimension paradigm model of policy failure (Source: Author)**



**4 Conclusion**

We draw conclusions from the common themes that emerged in our research based on academic work and in-depth semi-structured interviews with practitioners. We investigated the Czech experts' perception of policy failure, which lead us to redefining and reconceptualization of the theory of policy failure and success. A new dimension in the given theory model was discovered. We called it polity dimension. This may be the most general dimension compared to all the others (process, program and politics) but it is very important because it influences the method of policy making and implementation. We found four basic features of polity dimension (political culture, rules of the approval process, (majoritarian) voting system, and the government's term of office). This new concept can be considered as a guide on how to evaluate a policy (while remaining conscious of our principle values and paradigm).

Of course, we acknowledge that the results presented here are explanatory and should be confirmed in further research. On the other hand, our inferences are based on long-term study of the theory and on a specific case (on the reform of labor offices in the Czech Republic).

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# Validity of Recent Modifications of Healthcare System in Poland in the Light of Analogue Systems in Czech Republic and Slovakia

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## Abstract

The following article will present the evolution of Polish healthcare system, with particular emphasis on, as a most important element, preliminary effects of latest modification of healthcare system in Poland – “hospital network”. This transition of financial distribution is supposed to increase efficiency of hospital activities and, most of all, enforce additional savings in healthcare system. The author will present overall costs of healthcare systems in particular EU countries and will present additional suggestions, which are necessary in author’s point of view. As far as infrastructure of the Polish health system is concerned it is still at a very poor level. During the last two years, the state administration focused on the supply part of the healthcare system in order to decrease the abuse of contracts for the provision of medical services, liquidate the National Health Fund and introduce concentration of hospitals (the so-called “hospital network”). Comparing Middle-East Europe, it can be observed that Poland has one of the highest level of hospital treatment costs (35,66% in 2015). The main disadvantage of Polish healthcare system is the fact, that the following governments did not undertake thorough reforms and did not take out healthcare services from the spiral of debt.

*Keywords: healthcare system; costs of healthcare system; healthcare system in Poland; hospital network*

JEL Classification: H41, I110

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## 1 Introduction

The issue of financial stabilization of the national model of healthcare, in view of systematically increasing needs of societies, is a current problem of all countries, including those developed. Despite the geographic and economic proximity, European Union member states are diverse in terms of the operational regulation and sources of financing for national healthcare systems [10]. During the last two years, one of the most important reforms of the healthcare system in Poland has been prepared and implemented, i.e. the Act of 23rd March 2017 amending the Act on healthcare services financed from public funds, introducing the so-called “hospital network” [18]. This Act involves the introduction of a lump sum financing entities entering the network without any qualitative conditions for maintaining particular standard of medical services. A hospital, that meets the conditions and qualifies for this network would have a guarantee of an agreement with National Health Fund – approximately 93 percent of currently allocated resources for hospitals will be assigned for 516 public and 78 private entities. The network may include hospitals, that have had a contract for medical services for at least two years and where the emergency room or hospital emergency ward is functional. Hospitals are also required to operate specific departments listed in the Act. On the other hand, hospitals that do not enter the network will be able to apply for contracts for performing medical services under the competition procedure – the assumed sum for this purpose amounts of the rest 7 percent for 355 hospitals.

The essence and potential effects of this Act are the subject of thereof article. In addition, the author will propose additional activities both on the supply and demand side for the healthcare system in Poland. Due to the fact, that the Act of “hospital network” has been implemented on 4<sup>th</sup> May 2017 (and went into force on 1<sup>st</sup> October 2017), the discussion on the forecasted impact of the reform may be proceeded, which would be vital for any further research on reforms of healthcare system in Poland.

To understand the current state of the healthcare system in Poland, the dysfunctional development of the system after the end of World War II should be indicated, when the implementation of the so-called Semashko's model occurred [11]. The common part was the fact, that the administration of the system was strongly centralized and the healthcare system sector was attached to the national central planning system [17]. Contrary to the assumptions of the model, individual medical practices were never forbidden, however, the introduction of free healthcare services had a negative impact on the perception of the society towards any financial reforms of the healthcare system [6].

Transformations of the healthcare system after 1989 introduced elements of the market economy, but no efficient improvements were implemented [12]. The focus was on the decentralization of the system, the founding of the privatization of clinics and the modernization of the infrastructure. In 1999, the insurance system was introduced, in 2003 the National Health Fund as the main financial institution on the healthcare market was founded, in 2009 basket of negative and positive benefits was identified and in 2011, the transformation of public hospitals into commercial law companies began. The failure of thorough reforms introducing new financing sources intensified three negative factors of the healthcare system in Poland:

- First, after years of exploiting free medical care, society is negatively oriented to any financial participation in the use of medical services [8],
- Secondly, the increasing costs of the healthcare system seems out of control,
- Thirdly, the prognosis of the aging population in Europe means not only the need to adapt to evolving nature of demand for medical services, as well as securing additional funds for an increase of demand in the group of people at post-working age [16].

## 2 Material and Methods

Elements of the statistical method (in the area of statistical data analysis of the Central Statistical Office, Eurostat, OECD and the Ministry of Health in Poland) were used in this article to obtain forecasted effects of the reform of the healthcare system in Poland. Validity of the reform of healthcare system is also confirmed by the operational characteristics of healthcare systems in Poland, Czech Republic and Slovakia, as all three national systems started at a similar level from the collapse of the Soviet Union. Currently, the latest edition of the Euro Health Consumer Index distinguished reformed systems in the Czech Republic (referred to as the "star" of Central and Eastern Europe) and Slovakia (13 and 23th place accordingly). The same reports also emphasize the abandonment of reforms of national healthcare systems in Hungary and Poland (30th and 31st place in the ranking), which results in low efficiency of the system as a whole [5].

The aim of this study is to examine legitimacy and potential effects of healthcare reform in Poland on the basis of experience of neighboring countries – Czech Republic and Slovakia. The following article uses the following research questions to explore the subject:

1. What is the condition of the healthcare system in Poland in comparison to systems of neighboring countries – Czech Republic and Slovakia, as all these countries all started at the same level in 1989?

2. What are the projected effects of the Act on “hospital network” on healthcare system in Poland?

Any healthcare system is vulnerable to changes of the index of life expectancy, which has been significantly extended over the last 35 years due to technological progress, as shown in Table 1. In the last 35 years, life expectancy has increased by more than 6 years in European Union countries (Poland – 7,6, Czech Republic – 9,2, Slovakia – 6,7). The increase in the expected length affects a number of basic state functions, such as retirement policy, the value of the health insurance contribution or the division of expenditure on healthcare system.

**Table 1 Life expectancy at birth (Source: OECD data)**

Country	1970	2015
Poland	70,0	77,6
Czech Republic	69,5	78,7
Slovakia	70,0	76,7

The current state of healthcare system in Poland is a result of failure of deep reforms and any superficial alterations, that have occurred until now. Table 2 compares total expenditure on healthcare system in Czech Republic, Poland and Slovakia. There is a clear financial gap in case of Poland, especially when the population of a particular country is considered (Poland – 37,972 mln, Czech Republic – 10,578 mln, Slovakia -5,435 mln). The level of healthcare expenditures is increasing systematically. The demographic index assumes an increase in the share of people in retirement age from 14.7% of the total population in 2014 to 32.7% in 2050 [3].

**Table 2 Healthcare expenditures, 2015 (or nearest year) (Source: Eurostat data)**

Country	Total healthcare system expenditures (mln EUR)	Percentage of Gross Domestic Product
Czech Republic	12 202,11	7,24
Poland	27 280,04	6,34
Slovakia	5 418,25	6,89

Second aspect of healthcare system characteristics are its resources – entities, staff, technology. In this aspect, the number of practising doctors in Poland is below average of Czech Republic's and Slovakia's systems (presented in Table 3), where increased expenditures allows to employ more medical staff.

**Table 3 Number of practising doctors per 1000 inhabitants (Source: OECD data)**

Country	Number of practising doctors per 1000 inhabitants
Poland	2,3
Czech Republic	3,7
Slovakia	3,5

Similar situation occurs regarding practising nurses (per 1000 inhabitants). Again, a shortage of medical staff (nurses) in the healthcare system in Poland is confirmed in Table 4.

**Table 4 Number of practising nurses per 1000 inhabitants (Source: OECD data)**

Country	Number of practising nurses per 1000 inhabitants
Poland	5,2
Czech Republic	8,0
Slovakia	5,7

Deficiency of healthcare staff results mostly in longer queues for medical appointments or treatments and overload of professional obligations. Euro Health Consumer Index evaluates a whole section of Accessibility (waiting times for treatment) of every national healthcare system – it considers family doctor access at the same day, direct access to specialists, major non-acute operations in less than 90 days, cancer therapies in less than 21 days, CT scan in less than 7 days, A&E department waiting time. The results confirms accessibility of national healthcare systems – Poland received 100 points (the second worst result in the whole EU), Slovakia 163 points and Czech Republic received 213 points (one of the best marks in the whole EU) [5]. Single appointments for certain medical specialists in Poland have a longer waiting time – for example orthodontist (10,9 months), endocrinologist (10,3 months) and angiologist (7,7 months) [1].

Another aspects of healthcare system operating are conducted advanced medical services, for example magnetic resonance imaging - a non-invasive method of obtaining images of interior objects. Number of MRI's usage per 1000 inhabitants confirms lack of advanced resources of healthcare system in Poland. In comparison to analogue systems in Czech Republic and Slovakia, the number of MRI exams in Poland is significantly reduced.

**Table 5 Number of magnetic resonance imaging (MRI) exams (Source: OECD data)**

Country	Number of magnetic resonance imaging (MRI) exams per 1000 inhabitants
Poland	28,4
Czech Republic	48
Slovakia	56,8

The validity of the reform the healthcare system in Poland is also confirmed by data on hospital resources in the number of hospital beds per 100,000 inhabitants (Table 6). Between 2007 and 2014 the number of hospital beds (per 100 000 citizens) has decreased in Czech Republic from 730,61 to 645,46 and in Slovakia from 675,32 to 578,52. Yet in Poland the same index has increased from 642,38 to 662,70. Further stagnation in the number of hospital beds and maintaining the patient in the hospital (high level of an average period of hospitalization) will affect the high share of expenditures on hospital treatment - on which other groups of recipients of medical services will lose. Inpatient type of care (admission to a hospital) requires more resources, which results in higher expenditures (in comparison to outpatient care). This is reflective of the severity of inpatient cases, which require relatively more care and consequently more resources to manage. Additional costs such as lodging facilities and meals tend to increase admission costs [9], [15]. Potential savings could be achieved by implementation of a wider programme of outpatient care services and telemedicine systems, but that should be a subject of additional research.

**Table 6 Number of hospital beds per 100 000 citizens (Source: Eurostat data)**

Country	2007	2008	2009	2010	2011	2012	2013	2014
Poland	642,38	661,95	665,28	655,71	654,69	662,98	660,84	662,70
Slovakia	675,32	655,71	650,50	644,33	605,05	591,08	580,34	578,52
Czech Republic	730,61	718,74	711,41	702,56	683,59	666,12	645,67	645,46

On the basis of the data presented, the answer to first research question can be stated, that the healthcare system in Poland is in poor condition and is one of the worst system in European Union concerning performance, staff and resources in comparison to analogue systems in Slovakia and Czech Republic. The system requires more and more urgent modifications and in combination with the effect of an aging society require intervention above political interests or ad hoc activities. It should be remembered, that the effects of the introduced changes will not be immediate and will require years of implementation.

### 3 Results and Discussion

Data presented in the Material and Methods section proves, that the reform of healthcare system in Poland is necessary. Then, as the "hospital network" has been recently introduced, the discussion should be aimed at the evaluation of its assumptions and forecasted effects.

Significant changes in the healthcare system depend on political conditions. For example, in Slovakia, the government of Dzurinda (1998-2006) carried out extensive reforms, introduced a flat tax, implemented pension and healthcare reform and changes in the social system. Implemented reforms lowered support for the government (the society experienced severe changes in the country), which in 2006 resulted in the defeat of the ruling party in the

parliamentary elections [4]. However, it is only today, that the results of reforms implemented in Slovakia in 2004 can be observed.

The changes implemented in Poland as part of the "hospital network" concern only the supply side of the healthcare system and coincide with lowering retirement age threshold (which impacts the healthcare system in the form of decrease of labour power and taxes). Institutional changes seek to centralize the powers of the state administration (e.g. the establishment of a new office - the Public Health Office and the National Fund "Health", which will finance the reform). These are surface modifications, that a single patient will not experience to a significant extent. However, the law on "hospital network" is a change with potential significant impact.

The implementation of this project aims at regulations of the system from the supply side. In this manner, the Ministry of Health seeks to eliminate surpluses of medical services by hospitals, which is still the main reason for the spiral of indebtedness of medical entities. In addition, the updates on the valuation of individual medical services are projected, which will reduce the number of branches created due to profitable medical treatments, and not the actual needs of the regional community. The 'hospital network' also introduces a division into three levels of hospital units and qualifying for a higher category enables a wider range of financing for benefits and departments. Another significant change is the financial settlement in the form of a lump sum calculated per year (by category) [18]. Undoubtedly, the advantage of the Act is an attempt to stabilize the growth of hospitals in the country. The eligibility criteria for the "hospital network" were met by 516 public and 78 private hospitals out of total 949 registered entities. According to the author, in this case, there are potential savings from the liquidation of units set up to use overvalued medical treatments.

However, it should be noted, that due to the introduction of the Act, there are certain objections about the introduced principles. First of all, the "hospital network" guarantees funding for all the affiliated entities. This means the devastation of any elements of competition on the market. This aspect might deter private investors from allocating resources in the healthcare sector.

Secondly, the flat-rate amount allocated to each hospital unit at the beginning of the year may lead to a reduction of the work intensity of cost-intensive departments (e.g. ICU or internal medicine ward).

Thirdly, the purpose of the reform is to increase the motivation of the hospital staff to perform more treatments and consultations, but with constant contribution. However, transferring money without any competition for the whole year in advance is devoid of any motivating factors - the guaranteed financial situation does not lead to an increased efficiency, which is confirmed by many public sector companies [13].

Moreover, the introduction of lump sum financing means removing from the system the so-called surpluses of medical treatments, for which hospitals could previously apply for a refund of costs. This may result in a risk of shifting scheduled operations and queues.

Additionally, in the introduced legal act, the author notices two missing, but important aspects that should be taken into account in the matter of organizational grouping.

First of all, the Act does not allow the possibility of integrated orders for hospital units, that would gain a stronger negotiating position in the group and, as a result, a more effective pricing policy.

Second, the demand side of the system was completely omitted. If healthcare is treated as a standard service in an economic sense, then the prospect of constantly growing expenditures on the national scale requires increasing the rules of rationing. The introduction of minimum fees for basic medical appointments would enable elimination of both overproduction on the supply side and reduction of the growth in demand (i.e. excessive use of medical services). It should be noted, that Poland is one of the seven member states that have not introduced fees for the use of medical treatments [7].

Recent reforms in the healthcare system will not satisfy the financial needs of the system [2] - in this case, in the author's opinion, it is indispensable to introduce private health insurers. The abolition of the state monopoly in Poland on the mandatory health insurance market will

lead not only to an increase of the quality of customer service, but also to an improvement of financial and organizational efficiency of the system [11].

On the basis of the presented factors, the answer to second research question can be identified. The forecasted effect of the "hospital network" confirm its validity, yet projected effects are not supposed to overcome all negative factors of the healthcare system in Poland.

#### 4 Conclusion

The topic of healthcare system reform in Poland is an ongoing process. A characteristic feature is that almost all Central and Eastern European countries initiated on a similar level in 1989 [6]. A clear increase in the index of life expectancy on one hand and a low level of expenditure on the healthcare system on the other hand constitute the as main negative factors for healthcare system in Poland [14], which in the long term is not projected to withstand the growing needs of society.

This paper focuses on validity of reform's implementation in comparison to two neighbouring countries (Slovakia, Czech Republic) and presentation of forecasted effects of „hospital network“ reform. Two research questions in the paper have been answered, supported by statistical data and scientific literature.

The "hospital network" project should be considered a justifiable operation on the supply side of the healthcare system, but the lack of interference on the scale of demand for medical treatments may seriously undermine the reform. Yet without radical changes, apart from political interests related to the 4-year government term, it will be increasingly difficult not only to match the developed countries of Western Europe, but also developing systems in Central and Eastern Europe.

In conclusion, limitation of the paper ought to be mentioned. As the Act of "hospital network" has been recently introduced, the impact of the reform is still expected. The other limitation is the foundation of National Fund "Health" as an institution, which will finance the healthcare reform. Any modifications in this aspect may differently influence the healthcare system in Poland and change the assumptions of "hospital network".

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# Efficiency of Non-Profit Organizations – a Case of the Czech Red Cross Local Branches

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## Abstract

The efficiency of non-profit organizations is a key issue for stakeholders (especially donors and management) which are interested in efficient and effective utilization of resources. The aim of the paper is to compare the efficiency of local branches of the Czech Red Cross as important non-profit humanitarian organization in the Czech Republic. The relationship between financial efficiency (the expenditure to the number of paid staff, members and volunteers) and super-efficiency score (number of clients to the number of paid staff, members and volunteers) was investigated. The Data Envelopment Analysis (DEA) in its super-efficiency modification was used as an indicator of efficiency of the 69 LBs in the average of 2014 - 2016 because nonparametric DEA method has been more frequently used than parametric methods in the non-profit sector so far and super-efficiency modification emerged as a good method for efficiency evaluation of non-profit organizations. The results are fairly homogeneous and too many separate clusters have not been detected in the cluster analysis. Clusters were identified by combination of financial efficiency and super-efficiency scores. Authors revealed negative relationship between financial efficiency and super-efficiency score in 3 of 4 clusters.

*Keywords: non-profit organization; super-efficiency score*

JEL Classification: L30

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## 1 Introduction

The non-profit organizations are an important part of most economies. Their activities affect many areas of community life. John Hopkins' Institute defined 5 key characteristics which non-profit organizations have to follow [16]. They have to be organized, institutionally separated from the government and voluntary. They have to have their own management. They must not divide profits. Following the mission is a basis for evaluation of efficiency of the non-profit organizations. The financial indicators are not considered as key indicators of success in the world of non-profit. However, it is difficult to measure filling of mission – similarly as other soft determinants.

There are lots of types of non-profit organizations – from the point of view of size or specialization which is diverse. That's why it is not possible to use only one universal methods for evaluation of efficiency of non-profit organization. Therefore, we focused on one of the humanitarian organizations having a significant position in the non-profit sector. These organizations are focused on a person providing humanitarian aid. Their task is save lives, alleviate suffering and protect dignity not only during/and after natural disasters and other emergencies. At the same time they make effort to prevent from them and prepare for them.

The paper is dealing with the evaluation of efficiency of one of the significant humanitarian organizations in the Czech Republic – Czech Red Cross (CRC). The CRC is a member of the biggest non-governmental humanitarian network in the world – International Federation of Red Cross and Red Crescent. 69 Local Branch of the CRC (LBs) provide services to about 251 thousand clients with help of more than 18 thousand members, volunteers and employees.

LBs are legally and financially independent entities. They are managed by the HQ only from the methodological point of view. The HQ provides them with a part of financial sources (esp. coming from state subsidies and nationwide fundraising) for their activities. Each LBs is obliged to maintain the minimal standard of provided services, esp. first aid training, disaster

preparedness and non-remunerated blood donation. However, this offer of basic services is very often completed with social and medical services.

The literature (e.g. [6], [18]) confirms that it is not possible to apply methods of evaluation of efficiency within the non-profit sector since these methods for profit sector are based on certain conditions which would have to be met in the non-profit sector. To be able to evaluate success of the organization it is necessary to define what the success of the origination is, what criterions of this success are and who the stakeholders are from whose point of view we evaluate the success.

Financial indicators of efficiency are identified as the dominant indicators of success while studies in which proxies for mission accomplishment were used are relatively rare [5]. However, efficiency is a wider concept than financial performance. In general, the efficiency means a proper use of resources to perform tasks. The efficiency can be measured as technical or allocative [3]. Consider that the production frontier represents the maximum output available from each input level. Therefore, it reflects the current situation of technology in industry. The organizations are either on this frontier if they are technically effective or below this frontier if they are not technically effective.

Helmig et al. [5] present a system approach to the success of the organization. From their point of view achieving goals of the organization is only a part of the success of the organization. Achievement of goals is important, but the organizations should be also evaluated on the basis of their ability to obtain inputs, have an effective process of the input transformation and produce valuable outputs and maintain stable relations with the environment in which they occur.

Špička, Boukal and Vránová [20] state that the concepts of efficiency and effectiveness, which can be judged both quantitatively and qualitatively, are often used in the evaluation of success. Further, they consider the quantitative assessment more objective. As part of it, they point to the crucial question of quantification of outputs, as choosing an inappropriate indicator could distort the results. In addition, an example of qualitative research is LeRoux and Wright's study [12] where the efficiency was expressed using the Likert scale.

The work productivity is an important indicator of success in non-profit humanitarian organization because people (employees, volunteers, eventually members) are the ones who provide people in need with aid. To minimize the cumulative unsatisfied demand and maximize preferences of volunteers it is needed to optimize allocation of volunteers. It is necessary to emphasize that the maximization of the number of volunteers as workforce that can meet needs of community immediately is not an appropriate solution. Using the robust optimization approach the authors showed that coordinators of volunteers should consider adjusting system of assigning tasks to volunteers according to their preference. However, taking the preferences of volunteers as a key criterion for assigning tasks can lead to non-efficiency of work in the field, it is counter-productive (meeting the needs is not successful) [10].

The aim of the paper is comparison of efficiency of all LBs registered by the Executive Board of the CRC at the end of 2016.

## **2 Material and Methods**

From a methodological point of view, efficiency can be measured by using parametric or nonparametric methods. A non-parametric frontier approach based on envelopment techniques such as the Data Envelopment Analysis (DEA) or the Free Disposal Hull (FDH) has been widely used to estimate the efficiency of enterprises because of very few assumptions for the set of decision-making units (DMUs). On the other hand, the stochastic frontier approach (SFA) allows the presence of noise, but requires a parametric limitation of the frontier shape and the Data Generating Process (DGP) in order to identify the inefficiency noise and estimate frontier. In the non-profit sector, nonparametric efficiency assessment methods [11], [12], [13], [15] are more widely used than the parametric methods [8]. DEA does not assume any type of production function and distribution of variables, which is an advantage in the non-profit sector, where some axioms of neoclassical production functions are not a necessary condition, such as

maximization of profits. In addition, DEA creates a frontier curve that serves as a benchmark for measuring the comparative efficiency of DMUs.

In the paper, the efficiency of LBs was investigated by using non-parametric input-output analysis. For our purposes, DEA is limited of the fully efficient unit by 100 percent, so it is not possible to classify efficient units and comply with the conditions of subsequent parametric statistical tests. Andersen and Petersen [1] enabled efficient units to gain efficiency more than 100 percent by abandoning the restrictions that limit the score of the evaluated unit. This feature allows for better regression analysis or statistical comparison of efficiency between LBs, because it ranks efficient units. Alternatively, there are some problems with a super-efficient approach. They can move from the lack of rigidity of the units for these measurements, and extend beyond the option without a solution if convexity constraints are expected - such as the Banker, Charnes, and Cooper (BCC) model [4]. The Charnes, Cooper and Rhodes (CCR) models were used to evaluate the efficiency of LBs. Output-oriented modifications have been chosen because the non-profit sector is usually resource-oriented and non-profit organizations are trying to maximize output with a given amount of funding and labor-input. The CCR model assumes constant returns to scale. Critics of super-efficiency models [17] conclude that evaluating of the total set of efficient units is impossible because of the unsustainability of super-efficiency DEA models. However, the use of super-efficiency DEA models in the sensitivity analysis of efficiency classifications can be generalized from the CCR model to the situation of non-constant returns to scale.

The dataset was gained from the financial statements and the annual internal activity reports that each LB sends to the HQ and included data for all 69 LBs registered by the Executive Board of the CRC at the end of 2016. The three-year average (2014-2016) was calculated to exclude the impact of the exceptional year. Based on previous research [19], a possible set of inputs and outputs was proposed in the DEA model. In the set of variables there is no multicollinearity:

- input  $I_1$  - number of unpaid workers (members and volunteers)
- input  $I_2$  - number of paid staff
- output  $Y$  - number of persons reached by LBs services (clients),

The super-efficiency score ("Score") is measured by the relationship between the output  $Y$  and two inputs  $I_1$  and  $I_2$ . Average expenditure in thousands of CZK per one labor unit (members, volunteers and employees) are an indicator of financial efficiency ("Fin").

The aim of the article is to identify homogeneous groups of LBs due to their efficiency and therefore LBs were clustered according to two variables "Fin" and "Score". Medoid algorithm by Kaufman and Rousseeuw [7] was used. Two of the most difficult tasks in cluster analysis are decision on a suitable number of clusters and decision how to recognize the bad cluster from good. Kaufman and Rousseeuw define a set of values called silhouettes ( $s$ ) that provide key information about both tasks. The silhouette measures how well an object has been classified by comparing its dissimilarity within its cluster to its dissimilarity with its nearest neighbor. When  $s$  is close to 1, the object is well classified. When  $s$  is close to 0, the object is just between clusters A and B. When  $s$  is near -1, the object is poorly classified. Kaufman and Rousseeuw interpret the average silhouette  $SC$ . When  $SC$  exceeds 0.5, a reasonable structure has been found. Otherwise, the structure is weak and may be artificial. The Manhattan distance method [2] is used to place similar objects into one cluster.

In the end the hypothesis about a significant positive relationship between two variables "Fin" and "Score" between LBs was verified.

### 3 Results and Discussion

Table 1 provides descriptive statistics on financial efficiency and super efficiency scores and it shows high diversity in both evaluated variables between LBs. The LBs with the highest expenditures per one labor unit are LBs in region Prague 9, Jihlava and Teplice. On the other hand, there are LBs in region of Jeseník, Vsetín and Vyškov with the lowest expenditures per one

labor unit. LBs in regions of Liberec, Jihlava and Jablonec have the highest values of super-efficiency score and LBs in regions of Karviná, Louny and Jičín have the lowest values of it.

**Table 1. Descriptive statistic of variables (Source: Authors)**

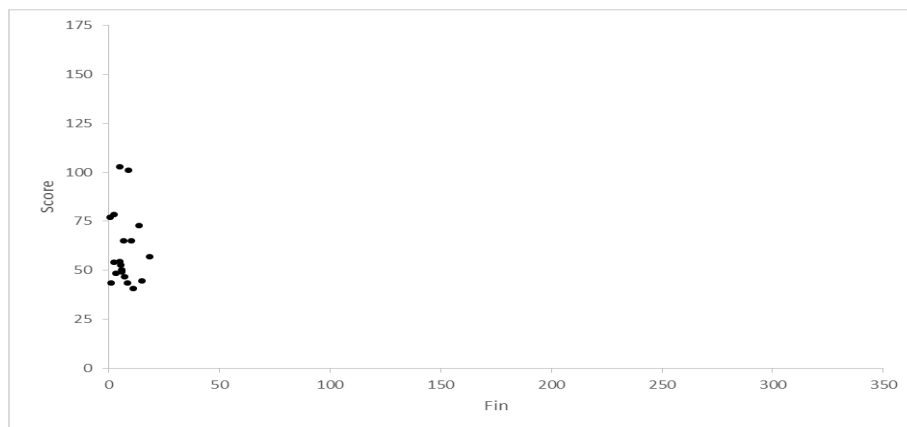
Variable	Obs	Mean	St. Dev.	Min	Max
Fin (thousands of CZK/unit)	69	23.53	43.00	0.33	305.47
Score	69	35.15	34.89	2.40	169.50

There are 4 clusters which is identified for LBs:

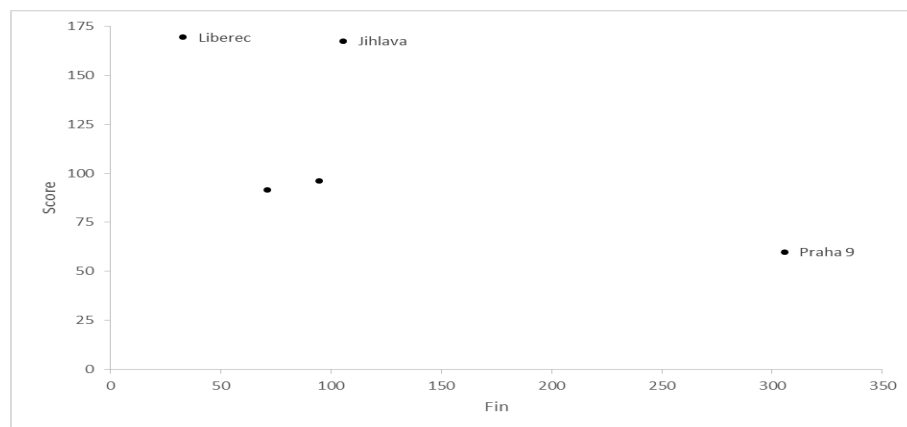
- cluster 1: Frýdek - Místek, Havlíčkův Brod, Chomutov, Chrudim, Karlovy Vary, Kladno, Kroměříž, Most, Opava, Ostrava, Pardubice, Plzeň - město a Rokycany, Praha 1, Praha 10 + Benešov, Tábor, Třebíč, Uherské Hradiště, Ústí nad Orlicí, Vyškov
- cluster 2: Jihlava, Liberec, Praha 7, Praha 9, Prostějov
- cluster 3: Beroun, Blansko, Brno, Česká Lípa, Český Krumlov, Děčín, Domažlice, Jeseník, Jičín, Kutná Hora, Litoměřice, Louny, Mělník, Mladá Boleslav, Olomocu, Písek, Prachatice, Přerov, Semily, Strakonice, Svitavy, Tachov, Teplice, Trutnov, Zlín
- cluster 4: Bruntál, České Budějovice, Hodonín, Cheb, Jablonec nad Nisou, Jindřichův Hradec, Klatovy, Kolín, Náchod, Nymburk, Pelhřimov, Plzeň jih + sever, Příbram, Rakovník, Rychnov nad Kněžnou, Šumper, Vsetín, Znojmo, Žďár nad Sázavou.

Scatterplots in Figure 1 to Figure 4 show values for both of variables “Fin” and “Score” for individual clusters and they allow views of groups of LBs with similar values of variables. Cluster 1 includes LBs that have low financial efficiency and medium super-efficiency score. In cluster 2 neither one of variables has a low value. LBs in cluster 3 have low super-efficiency score and in cluster 4 there are low values of both variables. In addition, only cluster 4 has reasonable structure with respect to the high SC value (see Table 2).

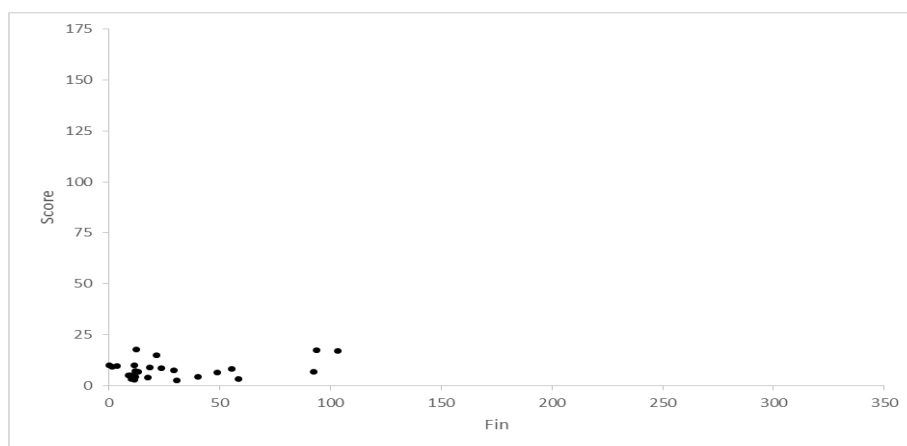
**Figure 1. Scatterplot of financial efficiency and super-efficiency score of cluster 1 (Source: Authors)**



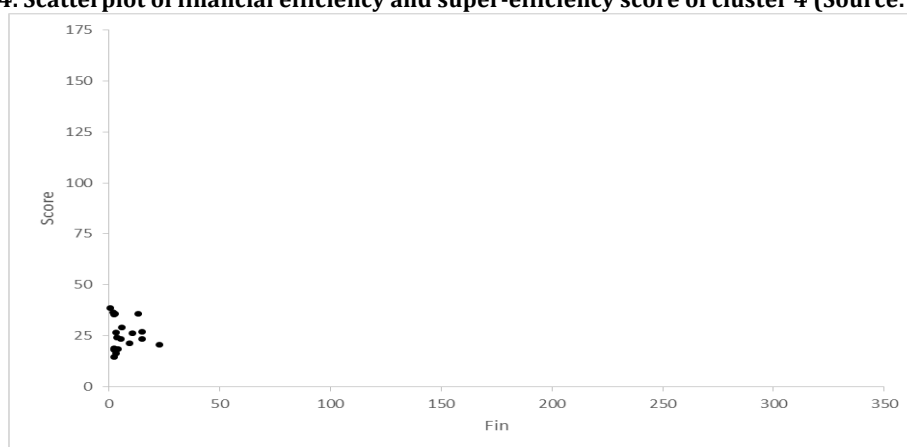
**Figure 2. Scatterplot of financial efficiency and super-efficiency score of cluster 2 (Source: Authors)**



**Figure 3. Scatterplot of financial efficiency and super-efficiency score of cluster 3 (Source: Authors)**



**Figure 4. Scatterplot of financial efficiency and super-efficiency score of cluster 4 (Source: Authors)**



**Table 2. Statistics of cluster 4 (Source: Authors)**

CRCLB	Average Distance Within	Average Distance Neighbor	SC
Znojmo	3.12	11,41	0.73
Rakovník	3.05	11.12	0.73
Plzeň jih + sever	3.12	10.70	0.71
Cheb	3.49	10.35	0.66
Bruntál	3.66	10.59	0.65
Klatovy	3.71	9.86	0.62
Žďár nad Sázavou	3.63	9.45	0.62
Hodonín	3.78	9.66	0.61
Náchod	3.67	9.27	0.60
Kolín	4.44	10.63	0.58
České Budějovice	4.35	9.51	0.54
Šumperk	4.42	8.87	0.50
Jindřichův Hradec	4.46	8.64	0.48
Rychnov nad Kněžnou	4.77	8.81	0.46
Nymburk	4.71	8.52	0.45
Jablonec nad Nisou	5.35	9.18	0.42
Vsetín	5.63	8.28	0.32
Pelhřimov	6.44	8.87	0.27
Cluster average	4.21	9.62	0.55

In cluster 1 there are LBs in regions of Chrudim, Plzeň - město + Rokycany and Kladno with very similar values (see Table 3).

**Table 3. Statistic of cluster 1 - selection (Source: Authors)**

CRCLB	Average Distance Within	Average Distance Neighbor	SC
Chrudim	6.02	13.05	0.54
Plzeň – město + Rokycany	6.34	13.45	0.53
Kladno	8.16	16.32	0.50
Pardubice	8.67	17.03	0.49
Vyškov	8.72	16.97	0.49
Kroměříž	5.26	9.76	0.46
...			
Cluster average	7.44	11.92	0.32

Figure 2 with variables for cluster 2 shows three extreme results, namely LB in region of Praha 9 with a relatively high financial efficiency and with a relatively moderate high super-efficiency score at the same time and LBs in regions of Jihlava and Liberec with a relatively high super-efficiency score and with a relatively low to medium financial efficiency.

At the same time, we can see a not very clear relationship between financial efficiency and super-efficiency score in Figure 1 to Figure 4. The Pearson correlation coefficients are listed separately for each cluster and for all LBs together in Table 4. Because of the fact that we worked with the entire population statistical inference methods have not been used.

**Table 4. Correlation between super-efficiency score and financial efficiency (Source: Authors)**

Cluster	Obs	Pearson correlation
Cluster 1	19	-0.10
Cluster 2	5	-0.68
Cluster 3	26	0.34
Cluster 4	19	-0.10
All clusters	69	0.18

Correlation is significant only in clusters 2 and 3. All correlations except in cluster 3 are negative. This means that higher financial efficiency is associated with a lower value of the super-efficiency score.

As in previous research on the comparison of Red Cross National Societies [20] these rather surprising results can be justified by the engagement of unpaid workers (members and volunteers) and standard (type) of services providing by LBs. In particular extreme results can be explained by the type of services providing by LBs, e.g. LB in region of Praha 9 focuses on the provision of social services with low number of clients (especially hoses for the elderly and protected and supported housing). On the other hand, LBs in region of Liberec and Jihlava offer services that serve a large number of clients - provision clothing to socially disadvantaged people and medical transport. LBs in clusters 2 and 3 involve significantly fewer unpaid worker than LBs in cluster 1 and 4 as measured by the proportion of unpaid workers per paid staff (see Table 5).

**Table 5 Descriptive statistics of unpaid workers' engagement (Source: Authors)**

Variable	Obs	Mean	St. Dev.	Min	Max
Cluster 1	19	187.31	174.37	13.33	723.00
Cluster 2	5	35.77	55.33	0.54	145.33
Cluster 3	26	36.11	46.18	3.03	183.33
Cluster 4	19	171.30	165.16	19.07	728.50

Results may have some limitations from a methodological point of view. The DEA method has been chosen as potentially suitable for evaluating non-profit organizations but it has limitations and cannot pretend to be a universal and fully effective method. The ability to measure and compare the values expressed in different unit is an important advantage of the DEA method. Selecting variables is the primary and often the most difficult aspect of DEA in the

DMUs comparative analysis [15]. Kuo and Lin [9] highlighted two limitations of the DEA model - the results are based on data integrity and number of DMUs must be larger than the sum of inputs and outputs. As number of inputs and outputs increases there are DMUs that achieve an efficiency rating of 1 and they become too specialized to be able to evaluate them with respect to other units. They recommend that the number of DMUs be at least two or three times the sum of the number of inputs and outputs. In this paper there are two inputs and one output and 69 observations, so the mentioned requirement is met.

Another limitation may be the counting of clients, e. g. for different types of services we can obtain data which may not lead to objective disclosure, some clients are counted always when they reached by LBs services, and the others are counted only once per year when the service is provided on regular basis.

#### **4 Conclusion**

The aim of the paper was to evaluate the efficiency of the local branches of the Czech Red Cross (LBs), one of the major humanitarian organizations in the Czech Republic. Based on the calculation of the efficiency by using of non-parametric DEA model and cluster analysis there are not detected too many separated clusters, the results are fairly homogeneous. Only one of four clusters has a reasonable structure.

The hypothesis of the positive relationship between super-efficiency score and financial efficiency was confirmed only for cluster 3. For other clusters there is a weak to moderate negative relationship between super-efficiency score and financial efficiency. Higher expenditures per one labor unit (members, volunteers and staff) lead to reduction of the number of clients reached by LBs' services per one labor units. The negative relationship can be explained by the extent of unpaid workers' engagement and type of services provided by LBs.

The LBs were divided into four clusters in our study. The reasons for such clustering will be further explored. We plan a questionnaire survey to give us a deeper insight into this issue.

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# An Insight into Financial Management Practices of Non Governmental Non-Profit Organizations

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## Abstract

Just like profit organizations, also non-governmental non-profit entities are at risk of financial vulnerability. This can be a result of unstable sources of funding or poor management thereof. The latter cause can be eliminated by using financial management tools. A "right" spending of the limited resources can allow for a long-term performance of the organizations' mission. The aim of the present paper is to describe the level of use of certain financial health assessment tools in selected Czech non-governmental non-profit organizations (hereinafter referred to as "NPOs"). The paper is based on the authors' research on the knowledge of selected NPO representatives about specific tools (or more specifically ratios) and their practical application. Furthermore, the paper attempts to compare the perceived situation with the actual situation of the organizations' financial health as assessed by the authors' own calculation of the given ratios. Quantitative and qualitative data on the selected sample of NPOs (foundations) are used to illustrate common financial health management practices that can be surprising to a certain extent. In fact, basic financial management tools are used to a rather limited extent and in assessing the entity they represent the responsible persons often "play it by ear".

*Keywords: non-governmental non-profit organizations; financial management; financial health; financial stability; ratios*

JEL Classification: A13, L31, H39

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## 1 Introduction

Considering their dependence on public sources of funding [18, 27], non-governmental non-profit organizations (hereinafter referred to as "NPOs"), in accordance with the structural-operational definition by Salamon and Anheier [30] (providing for the following characteristic features: organization; private; not profit distributing; self-governing; voluntary), can gradually become an "endangered species". In combination with the above mentioned dependence on public sources of funding (in the Czech Republic, they account for 65% of the organizations' funding [14]), the low resource diversification can be very risky, considering the unstable political situation soaked with populism. The solution of this situation is basically twofold. The organizations can either insist on diversification of their sources of funding, breaking from the dependence, or learn how to manage the limited resources better.

Even though the ideal solution would be a combination of both the possible ways, the aim of this paper is to examine the background of the latter. The authors aim to look into the existing knowledge and practices of selected NPOs in terms of financial management tools. It can be assumed that in many organizations, using appropriate tools can lead to the desired financial stability or financial health (the terms being used as synonyms), or more specifically to a greater security in terms of meeting the objectives the non-governmental non-profit organizations are established for.

In this paper, we compare the current available theory of financial management tools (or financial health assessment tools) with the findings on the actual NPO practice. These findings were made in phone conversations examining the NPOs' knowledge and practical use of selected ratios, and based on the authors' own calculations assessing the financial health of the respective NPOs. For needs of the research has been chosen foundation legal form within which especially "bigger" organization are operating (with regard to property, expenses and gains). Comparing theory with our findings, we subsequently formulate a few recommendations valid not only for the selected NPOs under examination. Nevertheless, outcomes of the research are based on

small sample and that is the reason why the conclusions can't be generalized. Despite this limitation, we dare to say that submitted contribution is justified. Generally, they are based on premises of utility of the tools used in the practice to ensure higher stability and sustainability of organizations.

### *1.1 Financial management and financial health in general terms*

This paper is based both on the theory regarding only the non-governmental non-profit sector and the theory on financial management in general terms (i.e. including theory on the private profit sector). The reason for this approach is mainly the fact that the theory on profit companies is more extensive and more wide-spread, as such being more available to NPO representatives who tend not to realize the differences between the sectors. Furthermore, some papers indicate that the application of tools common in the profit sector on the non-governmental non-profit sector is in fact possible and welcome [6, 10, 33].

In our research, we only focused on the Czech non-governmental non-profit sector and its representatives, and therefore we decided to predominantly use Czech sources that are both more accessible to Czech people and moreover often derived from foreign sources as well.

The aim of financial management, which can be considered the main aim of management in general terms, is to focus on all economic relationships of organizations [13] necessary for the organization to accomplish its *raison d'être* [35] without jeopardizing its financial stability. The authors [3, 16, 22] more or less agree on their perception of the term financial management as including a few basic activities: financial planning, financial decision making, operational financial management, financial analysis and ex-post financial control. At the same time they add that what can be used to support the financial stability (or health) of NPOs is strategic and financial planning [3, 5, 32], resource diversification (including fundraising) [5, 34], proper funding administration (including accounting) [23], and last but not least the NPOs' additional profitable activities [21].

Is assessing the standing of non-profit organizations or their projects, three aspects are commonly taken into consideration [24, 25]: economics, efficiency and effectiveness. However, the 3E method (as it's usually called), being even enshrined in law in the Czech Republic (for public sector representatives) [20], is not the only possible way to assess an organization.

To be able to perform a complex assessment of an organization's financial health, it is necessary to carry out a financial analysis revealing any disproportions between the plans and reality and identifying any weak spots. The financial analysis is usually mainly performed based on financial statements. In the Czech Republic, these are the balance sheet (an overview of the organization's property and its coverage), profit and loss statement (information about the organization's business results) and potentially the organization's annual report [4, 8, 11, 15, 17], i.e. documents that should be available in every organization. The legislation applicable in a given country can make the application of certain financial management tools more difficult. For instance in Czech NPOs, applicable legal regulations [19, 26] allow for using two different bookkeeping systems (single-entry and double-entry bookkeeping) based on different principles.

The approaches to financial analysis can be different (in the theory, the approaches are classified in different ways). Nevertheless, the authors agree that the financial analysis used in financial health assessment can be seen as centred around ratios [1, 8, 17], which are not time consuming, are highly reliable and allow for comparing commonly available accounting data. Yet another obvious advantage of ratios is the possibility to look into the past, assess the present and predict the future. [4]

### *1.2 Ratios as financial health assessment tools*

Out of the many ratios offered by the theory, we chose the following for the purposes of our research: autarky, profitability, liquidity, financing and productivity. Our choice was mainly motivated by the aim to provide a basic insight into the financial health assessment practice in

non-governmental non-profit organizations. The selected ratios occur across the Czech theory of financial management (see the above mentioned publications dealing with the profit and mainly the non-profit sectors: i.e. [15, 27]).

The individual ratios (and their selected modifications) used in our research are described in the brief overview below.

*Overview of the selected ratios (or their modifications):*

- *autarky – reflecting the level of self-sufficiency (i.e. independence);*  
*(autarky of the main activity on a cost-revenue basis; autarky on an income-expense basis; ratio of non-investment subsidy income to total operating income)*
- *profitability – reflecting the level of effectiveness;*  
*(profitability of additional activity costs; cash-flow profitability of additional activity; main activity loss coverage by additional activity profit; total cost ratio; cost variator)*
- *liquidity – measuring solvency (in relation to liabilities);*  
*(current ratio; quick ratio; cash ratio; net working capital)*
- *financing (indebtedness) – assessing the risk of debt financing;*  
*(financial independence ratio; credit risk ratio; debt payment ratio; leverage ratio)*
- *productivity – measuring the earning power and performance.*  
*(labour productivity; total capital appreciation based on added value)*

## **2 Material and Methods**

To achieve the set aim (to establish the NPOs' practices), we decided to use structured phone interviews with individual representatives of the Czech NPOs. We considered foundations to be the most convenient legal form for the purposes of our research. The selected legal form is a generally acknowledged representative of the Czech NPOs (in accordance with the definition by the Government Council for Non-Governmental Non-Profit Organizations [9] and the Czech Statistical Office Satellite Account [31]), and at the same time, the organizations with this legal form are among the larger ones both in economic and personnel terms, and it can thus be assumed that greater emphasis would be placed on financial management, as established in previous research as well [2, 28].

Foundations are NPOs founded to serve a permanent, socially and economically beneficial purpose. In addition to their main activity, foundations can carry out additional business activities. Founded using a charter of a foundation or disposition of property upon death, foundations come into existence on the day of their registration in the Foundation Register also containing a Collection of Documents including key documents on their operation. Foundations are to have a minimum permanent foundation capital of CZK 500,000.

Several public registers in the Czech Republic contain information on foundations, such as the Economic Entities Register, Foundation Register, and NPO Information System (hereinafter referred to as the NPOIS). In our research, we used the above mentioned registers to identify a group of foundations suitable for our purposes (the last source) and as an additional source of basic information in interpreting the results (e.g. age, number of employees, contact details, etc.).

Maintained by the Ministry of the Interior, the NPOIS is a voluntary register of organizations. It can thus be assumed that the entities registered are more responsible and trustworthy, while being more interested in their own (not only financial) management. Out of the 515 foundations existing in the Czech Republic in 2015 (the most up-to-date data provided by the Czech Statistical Office Satellite Account [30]), 44 entities were registered in the NPOIS at the time the research was conducted, which we consider enough for our research purposes.

The research itself consisted in carrying out phone interviews with relevant representatives of the organizations (i.e. directors, economic directors, economists, etc.). This method of data collection was chosen considering the low related costs, direct nature and mainly its quickness and expected high return. [7, 12] The aim of the interviews was to gather

information on the knowledge and use of ratios in financial management of the organizations. To achieve this aim, we used the below mentioned questions asked using a pre-defined procedure.

*Questions used in phone interviews:*

- *Do you use financial management (e.g. budgeting, financial plans) in your organization?*
- *Do you know the term "financial health"?*
- *Do you measure the financial health of your organization? (using what tools)?*
- *Do you know the following ratios: autarky/liquidity/profitability/indebtedness/productivity?*
- *Do you use the ratio: (...) or its modifications in managing your organization?*
- *Do you think that your organization is financially healthy?*

Based on the answers to the last question, we decided to compare the statements of the representatives of selected organizations with actual results of relevant ratios for the entities represented. Accounting data from public registers was used to calculate the relevant ratios.

### 3 Results and Discussion

#### 3.1 Participating organizations

Out of the 44 NPOIS registered organizations, we managed to establish contact with 15 organizations willing to share details about their operation (under the condition of anonymity). As for the 29 remaining entities out of the total 44 NPOIS registered organizations, 3 were not willing to cooperate; 3 didn't have up-to-date contact details in the NPOIS; in 8, it was impossible to get hold of a competent person; and in 15, it was impossible to establish contact for another relevant reason.

The 15 organizations participating in our research have very different basic characteristics. Some of the characteristics are described below. The data representing all the 15 entities is summarized in Table 1 below.

Most of the organizations willing to cooperate had higher foundation capital. The foundation capital of only five entities was lower than CZK 20 million, while in two instances, the foundation capital was even higher than CZK 100 million.

The participating organizations' average revenues from the main activity (i.e. the organization's mission) in the three last accounting periods were in different ranges. In half of the organizations (7 out of 15), the average revenues didn't exceed CZK 3 million; in three organizations, the revenues were even higher than CZK 25 million.

In addition to their mission, a vast majority of the organizations in our sample (12 out of 15) were carrying out an additional activity with the aim to support the main one (e.g. to cover the annual losses). The revenues from additional activities usually didn't account for much compared to total revenues (only in 3 organizations out of 12, the revenues from additional activities were higher than revenues from the main one).

In case of 12 out of 15 entities willing to cooperate, we were able to establish the number of employees. More than a half of the organizations (8 out of 12) had fewer than 10 employees; the remaining four entities had up to 25 employees. The "co-operative" organizations were mainly established before and in 1997; only one organization was founded after the year 2000 (more specifically in 2009).

**Table 1. Basic characteristics of organizations participating in the research (Source: Authors)**

Designation of foundation	Foundation capital **	Average revenues from the main activity (2014-2016) **	Average revenues from additional activity (2014-2016) **	Number of employees *	Year of establishment **
Foundation 1	76,616,350	25,715,333	2,896,667	19	1990
Foundation 2	45,295,161	2,183,000	158,333	5	1993
Foundation 3	21,600,000	1,544,667	74,000	NA	1994

Foundation 4	83,845,000	28,147,000	78,000	24	1993
Foundation 5	20,627,000	69,667	839,000	NA	1991
Foundation 6	163,073,000	15,132,333	9,683,000	9	1990
Foundation 7	1,380,000	2,774,333	3,681,333	5	1997
Foundation 8	32,791,908	1,288,667	690,000	5	1997
Foundation 9	101,743,649	34,458,667	-	24	1992
Foundation 10	2,150,000	3,501,667	542,667	5	1993
Foundation 11	500,000	4,756,000	-	5	2009
Foundation 12	18,000,000	9,617,000	-	5	1993
Foundation 13	71,056,390	679,000	1,750,667	9	1997
Foundation 14	20,006,608	728,000	3,708	NA	1997
Foundation 15	39,194,004	14,496,000	73,667	19	1992

\* Based on the Economic Entities Register (Czech Statistical Office)

\*\* Based on the Foundation Register: accounting data of the organizations

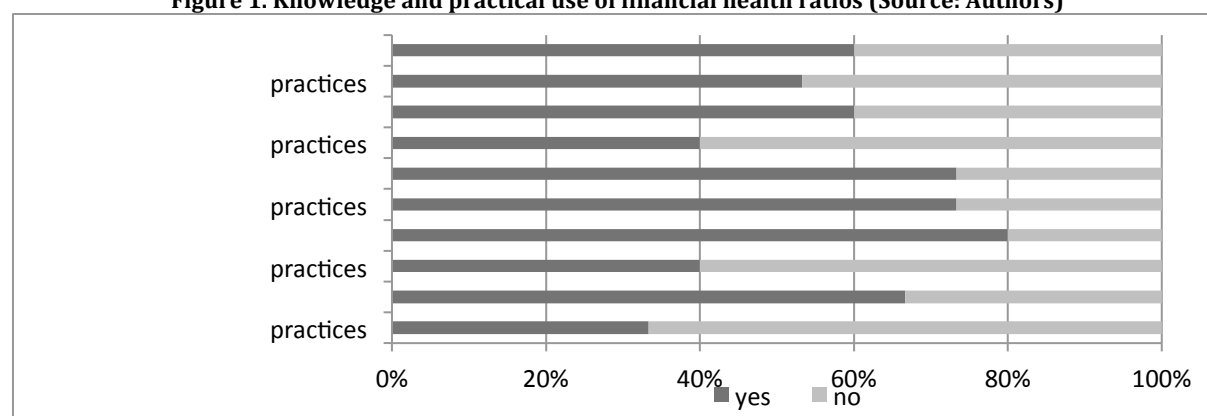
### 3.2 Financial health assessment practices of the participating organizations

The respondents (15 organizations) usually stated they were using financial management (budgeting, short-term or long-term financial plans, etc.) as it was necessary for the organization's operation. However, some respondents also believed financial management of an organization was not necessary (2). Most respondents had an idea about what the term financial health meant (13 out of 15). These also stated that they considered an organization as financially healthy when it had a balanced budget, was able to pay its liabilities and was thus "financially stable".

When asked about their own financial health assessment practices (or more precisely, using their own ratios), there was a lack of knowledge apparent across all organizations. A small part of the respondents (3 out of 15) stated they carried out financial health assessment using liquidity and profitability ratios. The remaining respondents were not able to name any financial health ratios as they didn't know any. This became evident in later questions as well.

The responses to questions regarding specific financial health ratios (identified either by name, or by a subsequent more detailed description of the given ratio) or their practical use in the specific organization were very variable. This variability is illustrated in the diagram below. In the diagram (No. 1), every ratio is illustrated in two lines, with the first line representing knowledge (the organization's representative confirmed they knew the ratio), and the second one direct application of the ratio or its modification in the organization (the organization's representative confirmed they used the ratio in practice).

**Figure 1. Knowledge and practical use of financial health ratios (Source: Authors)**



The knowledge of the five selected ratios was confirmed by more than a half (8 out of 15) of the organizations' representatives. However, the use of all five selected ratios in practice by the NPOs is much more limited (3 out of 15, or 3 out of the 8 above mentioned entities). Rather

surprising are the answers of three representatives of the participating entities (corresponding to the 2 above mentioned entities seeing the use of financial management in general as not necessary) claiming they didn't know or use any of the ratios mentioned above. Unsurprisingly, as for the other representatives, the knowledge and use of the selected ratios differ, with the use lagging behind.

The explanation for the disproportion between the knowledge and practical use, to be seen in most participating entities, is basically twofold. Firstly, some of the ratios (profitability or productivity) are directly related to additional (profitable) activities the participating organizations don't necessarily have to perform. Another reason can be the interconnection of the given ratio with the organization's funding from other than own sources (autarky or financing ratios); however, there were very few organizations like this in our sample.

A not very surprising finding (corresponding to the findings of previous research [2, 28]) is the apparent correlation between using the ratios and the amount of foundation capital, or the organization's revenues and number of employees. Even our research confirmed that the larger the organization in terms of property structure, economic activities or number of employees, the greater the perceived need to use financial management tools in its operation.

### *3.3 Perception versus reality – financial health of participating organizations*

As indicated above, the organizations' representatives were asked at the end of the phone interview whether they considered their organization financially healthy. Based on their direct experience with the organization, all the respondents answered "yes" to this question. Their confidence led us to the idea to compare the statements of the organizations' representatives with the actual results of the individual ratios. In spite of the apparent limitations (not knowing the environment), we decided to calculate selected ratios (or their variants, as listed on page 3 of this paper) for the given organizations for the past 3 years of their operation (i.e. from 2014 to 2016).

The basis for calculating most of the ratios was the Collection of Documents in the Foundation Register (financial statement data as confirmed by an audit). These materials proved insufficient for the calculation of the productivity ratio (with public data not providing the necessary information in full), and our control therefore was to be carried out without this ratio.

As expected, after all, the results of the individual ratios cannot be objectively interpreted without knowing the situation in the particular organization, with the results for the small sample being very variable. We at least tried to assess whether the results were better for those organizations claiming to use the given ratios in the phone interview. However, this fact was not proved either as many organizations apparently used the ratios to solve their existing (sub-) problems. Not surprising were the findings pertaining to organizations (2 out of 15) considering financial management as not necessary in the interview. In these organizations, the ratios indicated long-term (lasting for the entire duration of the reference period) and not addressed problems across several different economic areas (as shown mainly by the autarky, profitability and indebtedness ratios). The doubts regarding the financial health of these organizations can thus be expressed with more certainty than for the other entities.

## **4 Conclusion**

The aim of this paper was to examine the knowledge and practical use of selected financial health assessment tools (or more specifically ratios) in a sample of a selected type of NPOs (foundations). To achieve the aim, we made phone interviews with competent representatives of the organizations. In the interviews, we asked about the perceived importance of financial management, the knowledge and use of financial management, or more specifically particular ratios (autarky, profitability, liquidity, financing and productivity) which can be used in assessing an organization's financial health. Subsequently, we decided to compare the

statements on the financial health of particular organizations with the results of our own calculations of selected ratios.

A vast majority of the participating organizations' representatives (13 out of 15) perceived financial management in an organization as important; only two organization's representatives considered financial management as not necessary. Half of the representatives (8 out of 15) confirmed they knew all the given ratios with only 3 claiming to use all of them. The remaining organizations knew and used a rather limited number of ratios. It can thus be noted that the ratios were more frequently known than used, which we don't consider a significant problem, the knowledge of tools being a prerequisite for assessing their concrete usability and the need of indicators in the NPOs practice. On the other hand, the fact that the representatives of half of the organizations (7 out of 15) only knew a limited number of ratios could give rise to greater concerns. As pointed out in the interdependence theory by Salamon [29], certain amateurism is characteristic of the non-governmental non-profit sector (in contrast to the profit sector) and should be "fought against". Particularly alarming is the situation of two organizations not considering financial management as necessary, not knowing the selected basic ratios, and thus not using them in practice.

By comparing the statements of the participating organizations' representatives on their financial health with the results of particular ratios, we only managed to prove that organizations not carrying out any financial management whatsoever had long-term and not addressed problems across several different economic areas.

Our research confirmed certain theses advanced in previous research, namely that in larger organizations (in terms of property structure, economic activities or number of employees) there is an apparent greater need to use financial management. However, mainly considering the small sample, the possibility to generalize the results of this paper is rather limited.

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# Assessing the Impact of Public Research Funding on Scientific Production – The Case Study of Individuals in Slovakia

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## Abstract

Public funding is in many countries including Slovakia a large source of finances for research and development activities. Every year government provides significant support, especially to universities as they are research institutions mostly producing basic research. Wondering what effects have these investments is natural and may be crucial for decision makers. Moreover, with competitive project mechanism, which aims to obtain better results, one may expect that this way of funding will increase productivity of researchers. This paper is a pilot study in Slovakia measuring an influence of project funding and other variables on research outputs from grants. An analysis is applied on research teams of the Faculty of National Economy of the University of Economics in Bratislava. The results from regression analysis show positive impact of funding on publications of higher quality. However, no significant impact has a team size and a previous productivity of a project leader. This may be due to insufficient cooperation of researchers and putting much more emphasis on the publication activities of a project leader rather than on the whole team during the process of approving funding. The research teams may consist of less productive researchers then.

*Keywords: universities; public research funding; research output; universities*

JEL Classification: H52, I28, G28

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## 1 Introduction

Governments all over the world spend annually millions on providing support for research and development. Research requires substantial funding and states are interested in investing in this area as it contributes to scientific knowledge and economic growth [14]. Moreover, knowledge produced by basic research provides positive externalities for the whole society [11]. The key players in producing basic research in OECD countries are public universities [11]. Thus a high volume of public funding is devoted to them [4].

However, with limited finance, understanding the impact of government expenditures is crucial. Especially for policy makers, who may want to know how the marginal impact of a euro of research funding varies across researcher, institution or field [5].

Numbers of studies analysed the relation between funding and scientific production. However, authors dealt with different unit of measurement. Adams and Griliches [1] investigated the relationship between research and development funding and research publications of universities from 1981 to 1993. Employing panel regression on aggregated data of 109 US universities in 8 science fields, they found that the elasticity of research publications with respect to funding is near one. Rosenbloom et al. [15] examined the relationship between research and development funding and the production of knowledge outputs produced by academic chemists from 1990 to 2009. They measure the impact of funding on individual universities and discipline to capture the ways in which research funding supports the broader scientific system. They found strong positive causal effect of funding on knowledge production. However, the lack of these and other studies capturing university or department level lies in measuring the unit consisting of more research groups. Aggregated numbers of publications may be thus the result of other departments or institutions as well [16]. Therefore, Jacob and Lefgren [5] focused on measuring the causal impact of National Institutes of Health funding on the

productivity of an individual researcher from 1980 to 2000. They applied OLS regression and a regression discontinuity design to estimate the effects of receiving versus not receiving the grant on publications. Although their foundations show positive impact of funding on subsequent publications, it results in approximately one additional publication in the following 5 years. Ebadi and Schiffauerova [3] tried to investigate relations between the scientific output and several influencing factors. They measured an impact of the Natural Sciences and Engineering Research Council of Canada grants on a productivity of individual researchers in natural sciences and engineering. They cover a country level in years 1996 – 2010. Employing a regression model with various types of variables, they found significant positive impact of funding on the productivity of the researchers. The past productivity and team size also positively affected the rate and quality of researcher's publication. The surprising finding is that the career age negatively influences the quality of published works. Payne and Siow [13] analysed the impact of federal funding on scientific production of 74 universities from 1972 to 1998. Applying regression model they found that an increase of \$1 million in federal research funding to a university yields in 10 more articles. Modest impact was estimated on the patent production and no impact on the number of citations.

Since there is not yet a completely unambiguously described relationship between research funding and knowledge production, it is important to track and explore this area. The first step should be to examine how public research funding influences the knowledge production.

In Slovakia, universities are involved in creation of basic research by about 60 % [11]. They obtained 419.44 million euros on basic research only in 2015 and 67 % of these amount was reallocated through a project research mechanism [8]. Especially a competitive project mechanism puts more emphasis on outcomes and quality of the research. Moreover, it creates a general incentive to become more competitive and should yield in producing better results [2] [11]. Wondering whether investments in research through the project mechanism yields in outputs of higher quality seems to be natural.

This paper is a pilot study in Slovakia measuring what influence has project research funding and other variables on outcome of the individuals in projects. It is applied to research teams receiving grants at the Faculty of National Economy of the University of Economics in Bratislava.

### *1.1 Funding model of universities in Slovakia*

Slovak universities are funded from the state budget exclusively through a chapter Universities of the Ministry of Education, Science, Research and Sport of the Slovak Republic. The funding is then reallocated within four grants: to perform accredited study programs, to carry out research, development or artistic activities, to develop a higher education institutions and to ensure social support for students [9]. Grants for research activities have then a form of either institutional funding or are assigned for special purposes. Institutional grants are dependent on performance indicators of university such as share of university on research grants in previous years, number of PhD. students or share on publications. However, competitive mechanism is set up as well to receive grants via the Scientific Grant Agency and the Cultural and Educational Agency. The Scientific Grant Agency's funding is an internal grant system for the education sector and the Slovak Academy of Science focusing on science while the Cultural and Educational Agency's funding supports applied research in the fields of education and creative and performing arts. The whole amount assigned in 2015 for research activities through institutional funding was 147 million. The Scientific Grant Agency provided 9.4 million euros and this amount of grants remains almost the same every year since 2007 [9].

Funding of special purposes is organized through the Slovak Research and Development Agency, which focuses on basic and applied R&D and techniques carried out by the public sector, the universities, the business sector and non-profit sector [17]. Here again is employed a competitive mechanism and to obtain grant, one must propose research project. The Slovak

Research and Development Agency supported public universities with an amount of 13.5 million euros in 2015, what accounts for 54.24 % of the whole budget [8].

**Table 2. An overview of funding of public universities since 2007 to 2015 from different sources (project mechanism) (Source: own calculations based on yearly schedules of project funding of Agencies)**

Source	Sum (€)
Slovak Research and Development Agency	112 884 360.00
Scientific Grant Agency	87 689 199.17
Structural Funds	565 327 526.54
In Total (€)	765 901 085.71

Additionally, the Research Agency is responsible for allocating money from EU funds. In 2015, universities obtained 259.63 million euros from two operational programs (OP Research and Development, OP Education) [8].

From 2007 to 2015 was the overall amount given to public universities for research activities within project funding from national sources 200.57 million euros (Table 1). The Slovak Research and Development Agency provided 112.88 million euros and the Scientific Grant Agency funded public universities with 87.69 million euros. Their reallocation among universities was actually very similar to each other in the proportions in distribution [18].

The highest grants were reallocated via Research Agency, which supported public universities with amount of 565.33 million euros. However, these sources were not necessarily used only on research activities, but mostly on building infrastructure or research centres though. Because of this character, they do not require outcomes from the activities in the form of publications [7].

Because this paper is a pilot study with a focus on the grants within the Faculty of National Economy, let's take a look how the reallocation of the sources from the project research mechanism looked like there.

**Table 3. An overview of funding of researchers at the Faculty of National Economy since 2007 to 2015 from different sources (project mechanism) (Source: own calculations based on yearly schedules of project funding of Agencies)**

Source	Sum (€)
Slovak Research and Development Agency	685 543.00
Scientific Grant Agency	1 312 680.92
Structural Funds	354 038.82
In Total (€)	2 352 262.74

The Slovak Research and Development Agency supported researchers by 0.69 million euros from 2007 to 2015. Almost a doubled amount was given to them by the Scientific Grant Agency, it reached 1.31 million euros during the same period. We can see in Table 2 that the Research Agency provided to the researchers of the faculty 0.35 million euros.

## 2 Material and Methods

As we stated in the previous chapter, the Slovak public universities are funded in accordance with their performance, but they may obtain additional funding through a project research mechanism, which is ensured by four agencies. Since the Cultural and Educational Agency does not focus on research in science and grants provided from the EU funds do not

always yield in publications, it would be difficult to measure the effects of this support on outputs. The Slovak Research and Development Agency usually supports huge research teams from different organizations and the data about the outcomes from the projects are limited. Additionally, the reallocation of grants is very similar to the Scientific Grant Agency [18]. Thus we focus on the outcomes of the grants received from the Scientific Grant Agency, where researchers in order to obtain grant prepare project and after the call is announced, they submit it. During the initial evaluation of the project, in addition to the formal aspect, the publication of the leader of the project is taken into account so he is considered as the most productive individual. Research team also state in the application how much money is applied for and how many outputs in a sense of publications will project have. Thus we can watch whether this reallocation model stimulate them to produce more.

For the purposes of this study two databases were created: one consisting of funded projects and second one integrating the articles of the researchers. We collected the data about grants from yearly schedules of the agency, which are publicly available on the website of the Ministry of Education, Science, Research and Sport of the Slovak Republic. Additionally, we identified a time size of each project in accordance with a database obtained from the Ministry of Education, where all members of projects were stated including affiliation.

For collecting the data about the publications of the researchers in each project we used the database of the Slovak Economic Library of the University of Economics in Bratislava, where all the outputs of the researchers of the university are recorded. We included into the analysis only those projects, where all members including a project leader were from the faculty. This way we avoided a situation that some publications would not be captured because of not being recorded in the database of the university. We focused only on articles of higher quality. The acknowledgement-based search was employed and those articles stating that the support from the Scientific Grant Agency was applied were included into the analysis. To identify the previous productivity of project leaders, we use the database of the Slovak Economic Library as well, but we included all publications, not only those coming from projects. The time interval for running analysis was from 2007 to 2015. Regarding the years of 2007 and 2015, we include only projects starting in 2007. In 2015, we capture only the amount of grant assigned a particular year. So even if project continued in 2016, we do not include the amount of grant as well as publications from this year. This way we do not skew the possible impact of funding.

The next step was integrating the two created databases. By acknowledgement stated in the articles, we were able to identify the specific code of the project/agreement under which the researcher was supported. According to this specific code, we matched the database with a database of funding.

## 2.1 Model specification and variables

We explore the impact of funding and other variables on the quantity of publications within a project. The overall amount of articles is our dependent variable (*noPub*), as this has been widely used in the literature [1] [3] [5] [6] [15]. We apply an OLS regression model, which also appears often in the studies [1] [5]. The regression model is estimated as follows:

$$noPub = f(Fund + TeamSize + noPrevPub)$$

As independent variables we use overall funding in project (*Fund*), as we are wondering whether the higher amount of grant yields in more publications. Studies [3] [5] found positive impact, but they usually work with average values since they measure effects on individuals. However, by applying a project level we do not need to assume that grant is equally distributed among researchers. A team size variable (*TeamSize*) is used to explore, whether more researchers under the grant produce more publications. This is usually employed in order to find whether the cooperation yields in more outputs and studies [3] [6] actually found positive impact. Finally, a number of previous publications of a project leader (*noPrevPub*) is supposed to

observe whether the previous productivity might have an influence on current outputs. This variable often appears in the studies [3] [6] and has a positive impact as well.

### 3 Results and Discussion

During the period 2007 – 2015 researchers at the Faculty of National Economy handled 85 projects supported by the Scientific Grant Agency. Excluding those, where researchers from different faculties or the Slovak Academy of Science participated, we analysed 73 projects. The amount of grants thus represented 1,11 million euros in this period of time. Out of 73, only 24 grants resulted in publishing articles recorded in the Current Contents Connect database, Scopus or Web of Science databases. Moreover, the maximum number of articles is only 2 as Table 3 shows.

An average grant during the period was 15 301 euros. In 73 projects was the average size of a team 11 and the average number of previous publications of the project leaders was 2,7.

**Table 4. Summary Statistics of Variables**

Variable	Observations	Minimum	Maximum	Mean	Std. deviation
<i>noPub</i>	73	0.000	2.000	0.411	0.642
<i>Fund</i>	73	647.000	60784.000	15301.747	12729.768
<i>TeamSize</i>	73	3.000	22.000	11.219	4.532
<i>noPrevPub</i>	73	0.000	10.000	2.726	2.583

Before running the regression model, we first analysed the relationship between dependent and independent variables. According to the Table 4, the absolute values of all the correlation coefficients are quite low but some linear relationship seems to appear between an amount of grant and the size of a team per grant. This indicates that higher the size of a team is, higher is a grant obtained. Besides that, the degree of linear correlation among the selected variables is weak.

**Table 5. Correlation matrix (Pearson)**

Variables	noPub	Fund	TeamSize	noPrevPub
<i>noPub</i>	<b>1</b>	0.361	0.222	0.153
<i>Fund</i>	0.361	<b>1</b>	0.545	0.279
<i>TeamSize</i>	0.222	0.545	<b>1</b>	0.233
<i>noPrevPub</i>	0.153	0.279	0.233	<b>1</b>

The results from regression analysis show that only funding (*Fund*) actually has a statistically significant influence on the number of articles published within the projects. According to the linear model, funding has a positive impact on the scientific production within a project. This is in line with the results of other studies such as Ebadi and Schiffauerova [3], Payne and Siow [13], Jacob and Lefgren [5] who found that larger amount of funding will yield in higher number of published papers of individuals.

A team size within a grant (*TeamSize*) seems to have no impact on number of publications. This is in contrast with Ebadi and Schiffauerova [3] or Lissoni et al. [6] who found that collaboration in projects has very significant impact on current productivity. However, Lissoni et al. [6] focused on international nature of collaboration. We measured only outputs from projects

at one faculty, thus this may indicate that close collaboration in one organization may not be sufficient. Moreover, researchers may participate on more than one grant, thus their productivity is more distributed so they publish articles of average quality.

**Table 6. Regression statistics and results**

Source	Value	Standard error	t	Pr >  t	Lower bound (95%)	Upper bound (95%)
<i>Intercept</i>	0.073	0.196	0.372	0.711	-0.318	0.464
<i>Fund</i>	16.614	6.857	2.423	<b>0.018</b>	2.935	30.293
<i>TeamSize</i>	0.004	0.019	0.221	0.826	-0.034	0.042
<i>noPrevPub</i>	0.013	0.029	0.459	0.647	-0.045	0.072
<i>Observations</i>	73					
<i>R2</i>	0.134					

A previous productivity of a project leader (*noPrevPub*) does not have an influence on publications as well and is not correlated significantly with any other variable. This is in contrast with e. g. Ebadi and Schiffauerova [3] or Lissoni et al. [6] who investigated the impact of previous publications on individual's current articles published. One would expect that better previous productivity yields in better outputs from project in the coming year. However, in our case, the project leaders had on average only 2.7 publications before they applied for a grant. So their next productivity either did not stay on the same level, or their colleagues within a project did not maintain very well. This may indicate that in the process of approving funding more emphasis should be put on evaluation of whole research team and the publications, rather than only of a project leader.

Although our model explains only part of variance in the dependent variable, this issue occurs also in other studies [5] [16]. We included variables set, which often appears in studies and seems to have an influence on the number of publications produced. However, studies usually apply analysis on larger samples. This is a challenge for next research.

#### 4 Conclusion

In this paper we investigated the impact of project funding and other influencing factors on productivity of researchers within grants. As a pilot study, we measure effects on researchers at the Faculty of National Economy of the University of Economics in Bratislava. The regression model confirmed that funding has a positive impact on the productivity in project. Increasing funding by 1 million euros leads to an increase of quality adjusted volume of publications by 16. However, the financial sources are obviously limited and we cannot increase funding for every research grant. Thus, an effective allocation strategy should be well designed. Although this is only a pilot study and we cannot definitely provide policy recommendations and further research is needed, we come with few suggestions.

In our model, a team size of the project does not influence the outputs of the researchers within a project what is in contrast with other studies. Opening a research environment in a sense of a higher involvement of external researchers could be a solution to reach better outputs. A previous productivity of a project leader has no effect on outputs of the projects. This may be the result of putting emphasis mostly on publication activities of a project leader during the process of approving funding. We thus suppose that deeper assessment of research team should be implemented in order to focus on better results from funding - as this is the aim of competitive project mechanism.

However, because our model explains only part of variance in the dependent variable, the results shall be taken with some limitations. Thus, for next research, we would like to add more independent variables and extend the sample. We may also consider to apply different

regression models of count data. For other variables, we will collect data about the research grants within the whole university. We may also include a previous productivity of the whole research team members or a career age which seems to have an impact in other studies. And finally, we may consider to include only those projects which were successfully completed.

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# Economic and Spatial Analysis of Population Ageing

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## Abstract

Currently, the population ageing is one of the greatest social and economic challenges facing all EU member states. Therefore, the main goal of this study is to analyse the population ageing issue with detailed focus on Olomouc region and to discuss its economic aspects. As a method we use particular instruments of economic and spatial analysis. We firstly evaluate the consumption behaviour of seniors. In the next step, a spatial analysis of population ageing in the territory of the Olomouc region is processed, models of demographic projection are used to estimate the number of seniors in future years. This information is put into context with social services facilities for seniors – the current capacities, the number of candidates and the ratio of refusals are evaluated. Based on this data, an estimation of possible changes needed in the area of social services in the region is presented. At the same time, the riskiest areas of the region are defined regarding the ratio of the seniors to the social services offered.

*Keywords: seniors; ageing; economic impact; spatial; urban planning*

JEL Classification: H75, J14, O18

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## 1 Introduction

Population ageing is one of the greatest social and economic challenges facing the EU. Regarding actual development of the demographic structure of the population in EU countries, Eurostat published statistics EUROPOP2015 [10]. The median age of the EU-28's population was 42,6 years on 1 January 2016 and increased by 4.3 years (on average, by 0.3 years per annum) between 2001 and 2016, rising from 38.3 years to 42.6 years. Between 2006 and 2016 the median age increased in all of the EU Member States. Projections foresee a growing number and share of elderly persons (aged 65 and over), with a particularly rapid increase in the number of very old persons (aged 85 and over). These demographic developments are likely to have a considerable impact on a wide range of policy areas with respect to economic and financial issues [10].

In the Czech Republic, Ministry of Finance is regularly publishing the Macroeconomic forecast of the Czech Republic, including also the issue of population ageing. Based on it [14], it is obvious, that the group of older people over the age of 64 continues to grow and on the contrary, the working-age population declines.

We can look at the problem of population ageing from relative and absolute view. On the one side, the population began to age relatively – there began to be more elderly people and fewer working-age population and children. On the other side, in connection with the good living conditions of the inhabitants, mortality began to decline, and the average lifespan began to lengthen. The population began to age also absolutely – the number of old people [1].

Based on the economic view, a very important issue is the development of demand of the group of older people, their consumption patterns. This topic is analysed mainly by marketing scientists, which are focusing on concrete markets, for example, the market with tobacco products, medical products etc. Higgs [11] charts consumption by retired households in Great Britain in two areas; ownership of key consumer goods and key components of household spending. The results demonstrate mainly the growing extent of ownership of key goods in retired households and show the differences in proportional expenditure between retired households and the employed [11]. Wolf [18] describes that people often respond to retirement in conjunction with lifestyle changes; many such changes lead to changes in consumption

patterns. Changes in consumption expenditures expose consumers to different offers, leading to changes in consumer preferences [18].

Within the regions and cities, the economic issues are strongly connected with urban policy and urban planning. Population ageing and demographic development tend to increase the demand for healthcare, social security and the care for the disabled and the elderly. Carbonaro [6] examined the links between population ageing and demographic development, local economic development prospects, and the financial implications for urban policy. Demographic change impacts on a variety of components of the urban economy. Some of the key areas are urban labour markets, infrastructure planning and housing. But not only urban areas, but also rural places can be affected by these changes. The border between urban and rural can be difficult to differentiate, especially in connection with suburbanization [16, 17].

There is a lack of scientific studies focusing on more details on population ageing and its consequences with economic and urban planning issues. Therefore, this research is focused on the economic analysis of consumption behaviour of households of retired, the development of retired in the society (age index), possibilities of retirement homes, sustainable urban planning and economic aspects of this issue.

The main goal of this study is to analyse the population ageing issue with detailed focus on Olomouc region and to discuss its economic aspects. The Olomouc region is selected as a case study since detailed economic and geographic data are available for this region. Besides the main goal, the following objectives are formulated:

- evaluation of current situation and trends in the population ageing in the region;
- identification of the riskiest locations from the population ageing perspective.

## **2 Material and Methods**

### *2.1 Data*

For the purposes of the analysis of consumption behaviour of pensioners, we use: Expenditure and Consumption of Households statistics – Household Budget Survey, precisely Consumption expenditures – annual averages per capita in CZK and detailed development of consumption expenditures of households of pensioners without EA members [7]. For the prediction of the development of retired in the society, the following data sources are used: Social services establishments, Selected social security data, Five years population structure and Life tables. All these datasets also provided by the Czech Statistical Office [8].

### *2.2 Methods*

#### 1) Analysis of consumption behaviour of pensioners

Analysis of consumption behaviour of pensioners serves for the estimation of potential areas for additional investments into new social services. For the purposes of this analysis, we use Expenditure and Consumption of Households statistics – Household Budget Survey, precisely Consumption expenditures – annual averages per capita in CZK and detailed development of consumption expenditures of households of pensioners without EA members. We provide a comparative analysis of households of employees in total and households of pensioners without economic active (EA) members; the difference in consumption patterns is calculated as both difference in CZK and difference in %.

#### 2) Prediction of the development of retired in the society

Regarding the ageing of the population, the demographic situation in the territory of the Olomouc Region was evaluated in this study. In the statistical surveys, 65 years is usually used as the age of retirement. This statement also follows the definitions used at international level by organisations such as the UN or Eurostat. Of course, the age limit of 65 years does not always coincide with the actual start of retirement. The demographic projection is used to predict the future development of the population. The most commonly used population prognosis method is

a component method, that takes the age structure of the population in 5-year categories as a starting point and shifts population numbers by age group to higher age levels using survival probabilities [15]. These numbers are reduced by the number of deaths and enlarged by the number of births. The unborn population is calculated on the basis of expected development of fertility rates by the age of women. Migration is not considered in this component method.

As a tool for identification of elderly areas, a spatial distribution of ageing index is used. The ageing index is calculated as the ratio between the number of people at the age over 65 years per 100 children in age 0-14. It is often used as an indicator of demographic ageing of the population. Values displayed in the map can quickly deliver the information about current state and also development over past decade. In the same way, the spatial distribution of retirement homes with their capacity is evaluated and helps to determine zones with insufficient social services.

### 3 Results and Discussion

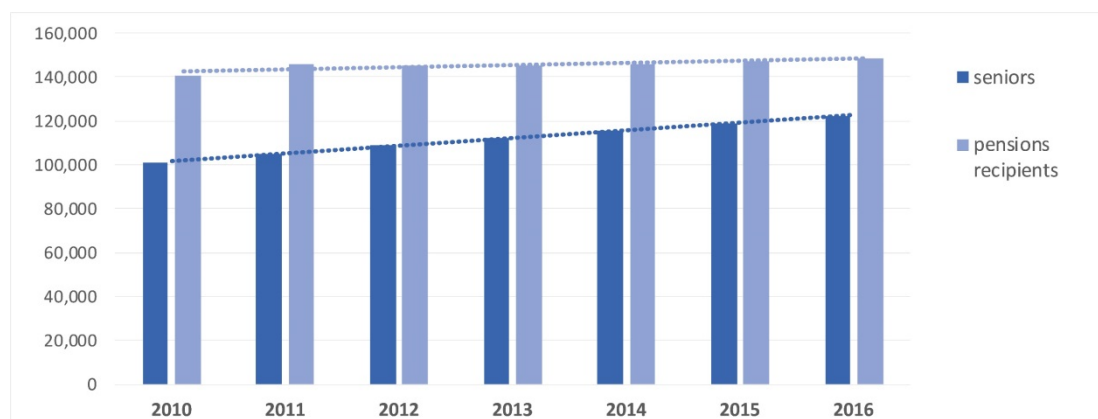
By 31st December 2016, 122,257 people over 65 years lived in the Olomouc Region and there were 148,420 registered recipients of pensions. It is clear that the age of 65 years as the retirement age is currently overestimated, also because many people decide for early retirement [9]. In connection with increasing of the retirement age, gradual wiping of this difference can be expected. Ageing is proved by a simple trend (Figure 1). The number of persons older than 65 years is increasing approximately by 3,500 persons per year. On the other side, amount of pension recipients does not have so clear trend, and in some years, also decrease can be observed (e.g. 2011, 2012, 2013).

**Table 1 Demographic projection (Source: CZSO 2015, authors)**

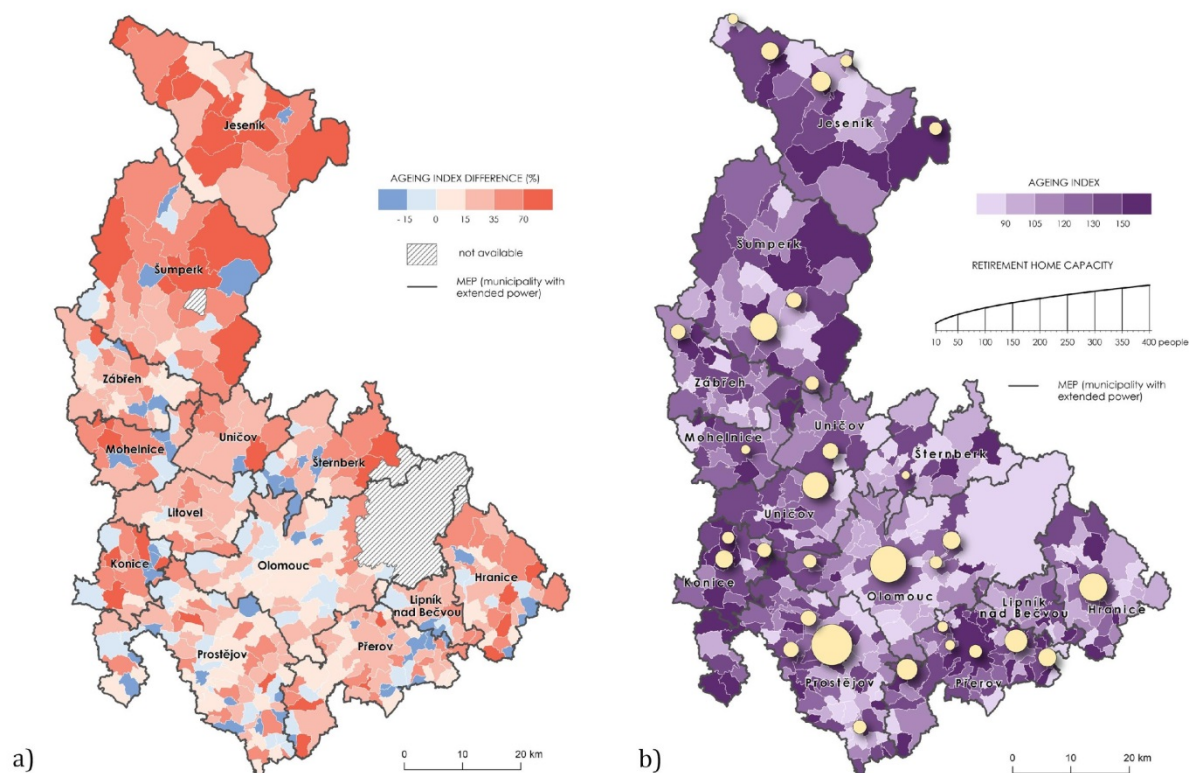
Age group	2015	2020	2025	2030	2035
0-14	95,884	94,781	84,867	75,753	69,509
15-64	420,019	399,827	390,581	378,801	363,866
65+	118,815	132,695	137,858	139,254	137,791
Ageing index	123.9	140	162.4	183.8	198.2

The population prediction in the Olomouc region was calculated for each age group at 5-year steps up to the year 2035 (see Table 1). The prediction results in both the total decrease in the number of inhabitants in the region and the gradual increase of the age group over 65 years. These two trends clearly indicate the ageing of the population, as also evidenced by ageing index values. Average value of the ageing index in the year 2016 is 128, which is slightly higher than the national average (120). Figure 2 a) shows its development in last 10 years: only 104 municipalities tend to be younger, the remaining 294 suffer from increase. Average values in these two dichotomous categories are unequal too – the average decrease is 16%, average increase 38%. Therefore, ageing not only predominates, but it is also more intensive.

**Figure 1 Development of seniors in Olomouc region (Source: authors, CZSO 2017)**



**Figure 2 Ageing index and its development (source: authors, CZSO 2017)**



With the increasing number of seniors, this research asks if it is possible to provide this human group with sufficient social services, necessary care and enable them to live a dignified and quality life.

The comparison of selected consumption expenditures (significantly higher consumption expenditures) in year 2016 in the Czech Republic in two groups of households – households of employees in total and households of pensioners without active economic members is presented in Table 2. For more detailed analysis see scientific study published by Burian et al. [5].

**Table 2 Comparison of selected consumption expenditures in 2016 in the Czech Republic (Source: CZSO 2017, authors)**

Consumption expenditure	Households		Differences in consumption patterns	
	Employees in total	Pensioners without EA members	Difference in CZK	Difference in %
Food and non-alcoholic beverages	23,854	29,244	5,390	122.6
Housing, water, electricity, gas and other fuels	24,175	34,063	9,888	144.9
Health	2,912	4,565	1,653	156.7

Focusing on significantly higher consumption expenditures of households of pensioners without active economic members in comparison with households of employees, it is obvious, that there are three significant groups of consumption expenditures - 1) food and non-alcoholic beverages; 2) housing, water, electricity, gas and other fuels; 3) health. This result should serve for the following planning of suitable locations for social services facilities.

There are currently more types of facilities providing social services in the Olomouc Region. For this research, retirement houses have been taken into account. In 2016 there were 34 such facilities with a total capacity of 2,674 people. The current spatial distribution of social facilities equally covers the territory of the Olomouc Region. Less accessibility is only in the northern part of the region between MEP (the municipality with extended power) Jeseník and Šumperk, as well as MEP Mohelnice and Zábřeh do not have high capacity (see Figure 2 b). The facilities of social services are (as expected) located in municipalities with a higher number of inhabitants or a higher proportion of people aged 65+, but the dependence between the number of inhabitants and the total capacity of the facility is not significant.

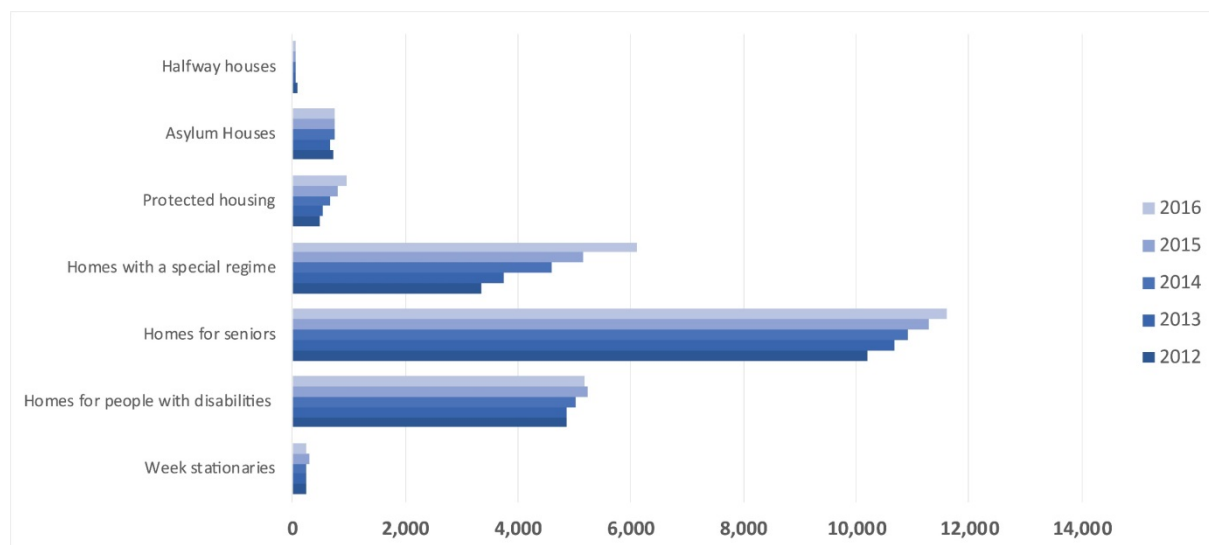
Evaluation of demographic data indicates long-term ageing in many of Olomouc region municipalities. The highest increase in the ageing index is in the northern part of the region and at east-north borders (municipalities Norberčany, Rejchartice and Mírov). On the other hand, biggest decrease is typical for small municipalities (less than 500 citizens - e.g. Šlégov, Hačky and Provodovice). These villages are located close to bigger cities, so the changes can be attributed to suburbanization processes.

Regarding this demographic development, new investments in social facilities should be expected. Considering the simple dependence between the current number of seniors and the capacities of retirement houses, a very simplified estimate can be made to illustrate how many new facilities with sufficient capacity will need to be built in the future.

Expecting approximately the same proportion of seniors using these services, it will be necessary to increase the capacity of the facility by approximately 415 places, keeping the average capacity of 70 people per facility, six new social service facilities will be needed. Unfortunately, retirement homes are not able to meet the needs of all applicants, much remains to be refused. The Ministry of Labor and Social Affairs records most of the rejected applications in the category of retirement homes (65,764 in the Czech Republic, 2016). There are no indicators comparing rejected applications to all applications, rejected applications can be relativized e.g. to 1,000 seniors. In this case, the worst situation is in Jihomoravský region (56 rejected per 1,000 seniors), Olomouc region registered 29 rejected applications per 1000 seniors, which is slightly worse than the national average (25 per 1,000).

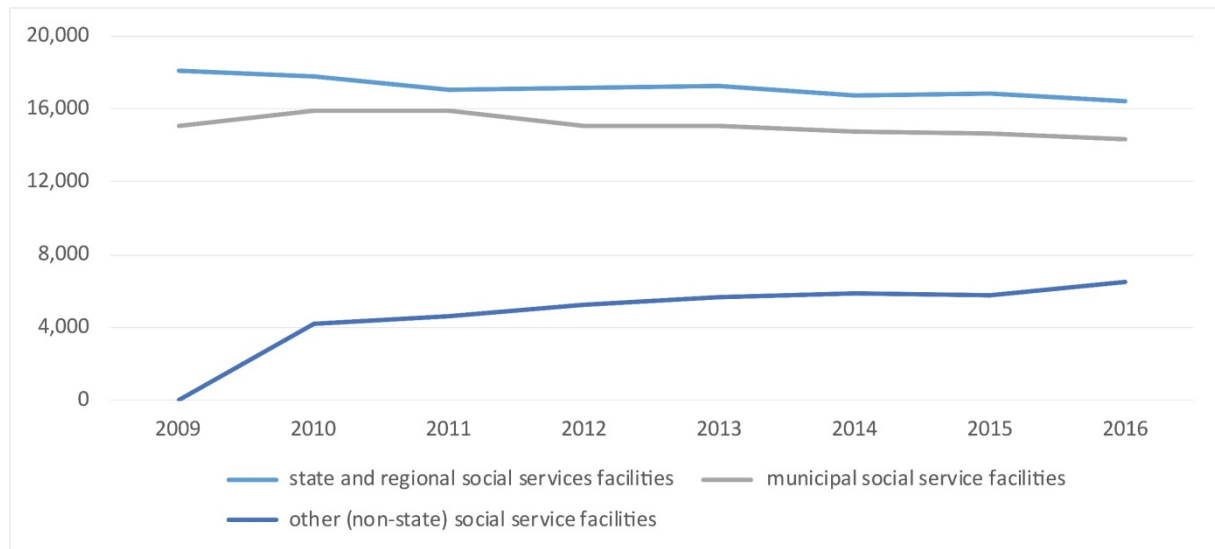
Focusing on economic aspects of population ageing and consequent planning of facilities for seniors, Figure 3 shows us increasing expenditures (in thousand CZK) on homes for seniors, homes with a special regime and homes for people with disabilities.

**Figure 3 Social services expenditures in thousands CZK (Source: authors, CZSO 2017)**



Since the highest yield of expenditures is represented by homes for seniors, it is interesting to focus on more details on the structure of ownership of these homes. As you can see in Figure 4, the number of state, regional and municipal houses for seniors is decreasing, on the other hand the number of non-state houses for seniors is increasing.

**Figure 4 Retirement homes – capacity (Source: authors, CZSO 2017)**



Based on the development of ownership of houses for seniors, the question of financing of planning and building of new social services facilities represents key issue for responsible local authorities. Dealing with increasing number of seniors and simultaneously higher demand for new facilities and houses for seniors, we can expect significant financial burden on both public and private budgets. On the other hand, based on the survey, almost 80% of seniors would prefer to finish one's days at home. This statement opens new discussion about enhance of investments into terrain social services, that would provide only the necessary help to the old people.

Comparing our results with other scientific studies, there is a lack of studies focusing simultaneously on economic aspects of population ageing and urban planning. We can find mainly studies focusing on development and testing of different models of healthcare planning based on more variables, including demographic variables, technological innovations, epidemiological changes and socioeconomic factors [2, 3, 4, 12, 13]. Based on these scientific studies and results of our research, it is obvious, that we should plan social and healthcare services facilities not only with respect to demographic development; therefore, the model should be more complex, including different variables which can be part of particular decision-making.

#### **4 Conclusion**

The main goal of this study was to analyse the population ageing issue with detailed focus on Olomouc region and to discuss its economic aspects. For the purpose of the main goal achievement, we use economic and spatial analysis.

Regarding the evaluation of current situation and trends in the population ageing in the region, we can say that our analyses prove a trend of population ageing in the region. In comparison with national numbers, the situation in the Olomouc region is a little worse than the national average (ageing index, retirement homes rejected applications etc.).

Focusing on identification of the riskiest locations from the population ageing perspective, thanks to spatial analysis and visualization, the most problematic areas can be discovered. At the same time, a spatial distribution of retirement homes is assessed – they are appropriately placed across the region. In connection with home capacity and the current trend of rejection of applications, many new facilities will be probably needed.

Regarding economic aspects, we can observe increasing demand for social service facilities, connected with population ageing. Since there are not only state, regional or municipal owners of these facilities, moreover the share of private facilities is increasing, particularly in

case of houses for seniors, the future financial burden will be divided between public and private stakeholders.

The future research can be focused on deeper spatial analysis, e.g. network analysis describing exact coverage of region by particular retirement home. At the same time, sophisticated models for urban planning can be used for detailed searching of suitable locations for new social facilities (e.g. Urban Planner). This kind of approach allows to include another economic data together with spatial information and then perform better complex analysis.

## Acknowledgement

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# Current Public Trends in Assessing the Effectiveness of Investment in Research and Development of Medical Devices

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## Abstract

The indispensability of medical technology consists in helping to prolong and improve human lives, mitigate or eliminate pain and suffering, increase the quality of medical care and improve its results. Since the population is aging, there has been a rise of people with chronic illnesses and the emergence of new disease states and syndromes. In addition, there is tremendous room for further expansion of the offer and its continued innovation.

The purpose of this article is to compare the methods used to evaluate the investment into the research and development of medical devices. The assessment takes into account economic, technological, legislative factors.

The results of the comparison show the strengths and weaknesses of the methods, all in the context of HTA, as a compulsory approach in the approval process of the new medical device by the State Institute for Drug Control.

*Keywords: medical device; research and development; investment*

JEL Classification: I15

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## 1 Introduction

The development of medical devices, whether they are expensive devices, specialized applications, technological processes or specific devices, is an economically challenging process that involves many factors from financial, time, personnel, legislative, safety and medical constraints.[1] The development of the device itself, as well as the development of new drugs, should be encouraged prior to development, using specialized and sophisticated economic methods. These methods make it possible to significantly reduce the risks of developing a new product and its successful use on the market. Unlike normal developments where engineers and scientists usually focus on the best medical-technical solution, the economic-managerial view and related methods are very successfully used in various fields of commercial and non-commercial spheres. By setting the conditions for a new product, it is possible to predict its success or risks in the planned life cycle of the product.

The Food and Drug Association (FDA) depends on rigorous science in its decision-making process, which enables medical device developers to have a solid ground for their product development. In addition, sound science also depends on the tools, which can effectively and precisely assess the product performance at all points in the process.

FDA identifies three types of medical device development tools (MDDT):

Clinical Outcome Assessment: the tools that assess how patients feel or behave, including patient-reported or clinician/observer-reported assessments or performance outcome measures, such as walking speed or memory recall;

Biomarker Test: the applied tool (test) is to give diagnostic, predictive, or safety biomarkers for patient choice or as clinical study endpoints. These can be blood pressure or an assay that identifies a hormone level to decide whether the patient is a safe and right candidate for the clinical trial; and Nonclinical Assessment Model: the tool (model or method) that assesses or predicts a device performance such as a computer model or a material phantom of the heart[2][10].

Expertise about the cost-effectiveness of innovative technological devices or new strategic guidelines aimed at health care form an essential prerequisite for their implementation in common practice.

The purpose of this article is to compare the methods used to evaluate the investment into the research and development of medical devices. The assessment takes into account economic, technological and legislative factors such as costs, market size, risk level, return on investment rate.

## 2 Methods

The methods included in the comparison can be divided into three groups: 1. strategic and economic evaluation of projects (e.g., NPV, IRR, DCF), 2. multi-criteria decision-making methods (AHP Analytic Hierarchy Process), 3. advanced analytics (Bayesian Networks, Expert Systems, Fuzzy Models).

In addition, the following methods are used in the research: a retrospective analysis (of related research) and structured interviews with experts. The retrospective analysis focuses on the opportunities, threats, as well as other factors that can influence the future selection of the evaluation methods used in industry. The structured interviews were conducted with three people from the company for the development of medical devices one from the positions of the head of the economic department and two development workers. In addition, there was one person involved in the development of medical devices in the academic environment. The interviews were held from March to June 2017. Furthermore, the authors deal with all the medical devices, including those in the groups of the highest risk according to the following categories:

Medical devices according to IPC division are as follows:

A61B - diagnostics; surgery; identification

A61C - dentistry; devices or methods for oral or dental hygiene

A61D - veterinary instruments, utensils, aids or methods

A61F - filters implanted into blood vessels; prostheses; preparations ensuring the penetration or preventing the collapse of tubular body structures, e.g., stents; orthopedic, nursing or contraceptive devices; heating; treatment or protection of eyes or ears; bandages, bandages or absorbent pads; first aid kits

A61G - personal means of transport or equipment specially adapted for patients or handicapped persons; operating tables or chairs; chairs for dentistry; burying devices

A61H - apparatus for physical therapy; massage; bathing equipment for special medical or hygienic purposes or certain parts of the body

A61J - packaging specially adapted for medical or pharmaceutical purposes; devices or methods specially adapted for the treatment of pharmaceutical products in particular physical or delivery forms; eating or mouth-feeding devices; soothers for small children; sludge collection devices

A61K - preparations for medical, dental or hygienic purposes

A61L - methods or devices for sterilizing materials or articles in general; disinfection, sterilization or deodorization of air; chemical aspects of bandages, dressings, absorbent inserts or surgical articles; materials for bandages, bandages, absorbent inserts or surgical articles

A61M - a device for inserting media into the body or applying media to the body; devices for transferring body media or for removing media from the body; devices for inducing or terminating sleep or stiffness;

A61N - electrotherapy; magnetotherapy; radiation therapy; ultrasound therapy

A61P - specific therapeutic effect of chemical compounds or medicinal products [11]

Furthermore, methods are selected regardless of the classes of medical devices. Therefore, all of the following. Medical devices (MD) of class I, IIa, IIb, III: MD is classified in that class according to the degree of risk represented by its use to the user or to another individual. The classification of the MD into one of these classes is carried out according to the rules set out in Annex 9 of the Government Ordinance no. 336/2004 coll., possibly in Annex IX of the Council

Directive 93/42 / EEC regarding the MD, as amended. In the case of Section 52 "Transitional Provisions" of the act, the provider is responsible for classifying the MD, subject to the provisions of paragraphs 3 and 4, to the classes under the above mentioned legal regulations (Section 52, paragraph 5).

### 3 Results and Discussion

The basic overview of the methods used in relation to the evaluation of the effectiveness or the wider impact of the medical devices is summarized in Table 1.

**Table 1. Evaluation of the strengths and weaknesses of economic methods for the medical device development (Source: own based on[13]-[19])**

	<b>Strengths</b>	<b>Weaknesses/Risk</b>
NPV, IRR, DCF	<ul style="list-style-type: none"> <li>• Most of these selected methods are not time consuming</li> <li>• Low cost of these methods</li> <li>• With the use of multiple methods – high reporting value</li> </ul>	<ul style="list-style-type: none"> <li>• Proper interpretation of results in the context of other processes in the enterprise</li> <li>• Necessary combination of multiple indicators</li> <li>• High demand of the methods on the preciseness of its input</li> </ul>
Cost-benefit analysis	<ul style="list-style-type: none"> <li>• Taking into account the qualitative factors influencing CC implementation</li> <li>• Complex method of solving the problem in the context of the type of enterprise allows the conversion of qualitative variables into quantitative expressions</li> </ul>	<ul style="list-style-type: none"> <li>• Time consuming</li> <li>• Higher cost of the method</li> <li>• Low common use of the method in Czech companies</li> </ul>
Cost-utility analyses	<ul style="list-style-type: none"> <li>• Complex method</li> <li>• Familiarity of the method</li> </ul>	<ul style="list-style-type: none"> <li>• Complexity of its calculation</li> <li>• Demands on initial data</li> </ul>
Cost-effectiveness	<ul style="list-style-type: none"> <li>• Familiarity of the method</li> </ul>	<ul style="list-style-type: none"> <li>• Demands on initial data</li> </ul>
Budget impact analysis (BIA)	<ul style="list-style-type: none"> <li>• Complex method, its usability both for companies and clients</li> </ul>	<ul style="list-style-type: none"> <li>• It requires a transparent estimate of the size of the population that will use the device</li> </ul>
	<b>Strengths</b>	<b>Weaknesses/Risk</b>
AHP	<ul style="list-style-type: none"> <li>• Complex decisions based on the balance of quantitative data and qualitative data (judgements about the variables from decision-makers).</li> </ul>	<ul style="list-style-type: none"> <li>• Necessity of expertise in economic evaluation - limited in industries</li> </ul>
Conjoint analysis (CA)	<ul style="list-style-type: none"> <li>• Sophisticated method to elicit customer preferences</li> </ul>	<ul style="list-style-type: none"> <li>• Necessity of specific knowledge</li> </ul>
	<b>Strengths</b>	<b>Weaknesses/Risk</b>
Bayesian Networks	<ul style="list-style-type: none"> <li>• Possibility of incorporating individual and original factors according to the specifics of the given market</li> </ul>	<ul style="list-style-type: none"> <li>• High need for expertise</li> <li>• Time consumption</li> <li>• Ensuring quality data</li> </ul>
Expert Systems	<ul style="list-style-type: none"> <li>• Useful when a decision problem involves risk that is continuous over time, when the timing of events is important, and when important events may occur more than once</li> </ul>	<ul style="list-style-type: none"> <li>• Need for specific software</li> </ul>
Fuzzy Models		

Based on the expert interviews, one of the key methods for assessing the effectiveness of medical devices is the Budgetary Impact Analysis (BIA). At present, BIA is an integral part of a

comprehensive economic assessment of new technology before entering the market. It is one of the last points before entering a reimbursement system. BIA describes how the treatment scheme (pharmacotherapy and non-pharmacological practices) will change after the introduction of the new treatment intervention, as well as about the financial impact of this change. It is necessary for planning financial resources from health insurance and nowadays, it is required by most regulators in the field of reimbursement regulation (e.g. Australia, USA, Great Britain, Belgium, France, Italy, the Netherlands, Hungary, Poland). The necessary bases for the quality analysis are as follows [18]:

- Prevalence of the disease in a given population
- Incidence of illness for a given period of time
- Estimate of the number of patients who can be treated
- Cost of the existing and new therapy per unit of time

The prevalence of the disease in a given population is determined by the number of patients with a given diagnosis, or a precisely defined subset of patients with relevant characteristics (e.g. disease stage, non-responders to existing therapy, etc.) according to verifiable sources (IHIS, registries, or epidemiological studies), possibly expert opinions in the absence of published data. The incidence of illness for a given time disease is a patient increase of usually 1 year. In the first years, it is also necessary to take into account "waiting patients", who meet the indication conditions and for the inaccessibility of the therapy have not been treated yet. The estimate of the patients who can be treated is a subset of the patients from the above group, who can receive the realistic estimate of the therapy for a given period. In addition, the costs of the existing and new medical device per unit must be recorded. Frequently used method is CBA, which belongs to the group of cost-benefit analysis methods. These include, apart from the most commonly used Cost-Benefit Analysis (CBA) method, Cost-Effectiveness Analysis (CEA), Cost-Utility Analysis (CUA), Regulatory Impact Analysis (RIA). The Cost-Benefit Analysis (CBA), or Cost-Benefit Measure, is a type of rational approach to decision-making. The assumption of CBA is that the value of all negative and positive impacts is measurable in monetary units. Moreover, the assessment of the yields in the monetary units brings a homogeneous scale to the analysis, and there is no need for measurement and comparison of benefits. As a result of CBA, there are several standard financial indicators (NPV, IRR, DCF) that allow to compare projects among one another.

Another large group is formed by decision-making methods. The multi-criterial analysis of variants consists in the weighting of the criteria so that their sum is equal to one. The different methods of balancing differ, in particular, by their complexity and difficulty in the type of information they need to know. Among the methods that can be used, for example, to determine the criteria weighing, are: ranking method, scoring method, pairing method, Saaty method, gradual weight planning method. A lot of methods have developed over the years. With this help, the users should be able to choose the most appropriate solution to the problem or to obtain a preferential arrangement of the variants and to justify their decision accordingly. The methods differ from one another in the situations in which they are used, as well as by the number of criteria, the methods of calculation, and the claims placed on the investigator. The multi-criteria analysis tasks can be classified, for example, according to the goal of the solution to:

- tasks aiming at choosing one option marked as compromise,
- tasks aiming at a complete arrangement (quasi-arrangement) of variants,
- tasks aiming at the division of a set of variants into effective and inefficient ones.

An important part should be the sensitivity analysis. The decision-making methods also include the AHP and QALY ratios, which are common in evaluating the device for the State Institute for Drug Administration (SIDA). Like AHP, the conjoint analysis (CA) has been developed for measuring human perceptions and preferences. It is widely used as a marketing research tool for consumer products. CA attempts to break down a decision into its component parts. The advanced analytics as the last key group contains the following method. It is concluded that the adoption of the Bayesian network modelling approach that reduces investment and policy risks associated with the investment to medical device market can act as usefully due the diligence and decision support tool for a number of private, public and

community sector stakeholders active in this sector, in particular for the key decision and policy makers.

Based on the expert interviews, new European regulations seem to be essential to regulate medical devices and diagnostic medical devices in vitro. The European Commission has proposed them in particular to respond to several serious cases where poor quality products have harmed people's health. The adopted regulations are intended to bring more transparency and legal certainty to manufacturers and importers and contribute to greater international competitiveness and innovation. For small companies that produce one or only a few products, this will be a major problem consisting in a price hike and reduced competitiveness. At the same time, the introduction of the UDI system will allow far better traceability of these products.

## **Discussion**

The fundamental benefits of strategic and economic evaluation are in relation to common methods of assessing investment in the business economy:

- complexity,
- possibility to use both static and dynamic methods,
- possibility to convert qualitative variables into quantitative expressions,
- on the other hand, its high quality performance requires the involvement of a medical device professional,
- codifying new legislative changes in relation to the types of medical devices.

Using these methods also involves certain risks. From the point of view of the method itself (CBA, CUE), this is a very good analysis, in case of correct implementation and compliance with the basic rules. Problems of using the method are related to technical limits. These can make it impossible to quantify and then to transfer the substantial impacts of the project (a lack of input data, problematic availability of suitable methods for transferring consequences of effects into financial flows). The problem is also related to the most accurate setting of the discount rate. The question of choosing a discount rate, or the required rate of return, can significantly affect the resulting calculation and the resulting value, e.g. Net Present Value (NPV) or another criterion. The setting of this interest rate should therefore be given the greatest attention. Other factors that may reduce the CBA's predictive value are errors in individual CBA steps. This includes, for example, the non-uniform monitoring of entities within the project. It should not happen, for example, to track the revenues of some entities at the expense of others. When subjects are included in the analysis, they should be monitored as fully as possible for each of them. Another problem is the omission that some of the benefits of a particular subject may be at the same time harm to someone else. The duplicate inclusion of some project impacts is another factor that distorts overall output. It is not possible to count as a benefit, for example, the increase in the sales of a business entity and, at the same time, the increase in wages from these revenues paid to the employees of the entrepreneur.

An important factor in the processing of all methods is the analytical staff themselves. Advanced, specific knowledge is required in the advanced methods. It is desirable that the persons who will specify the impacts of the project would be also medical device professionals, and there would be no error in the specification of positive or negative impacts. It may also happen that some effect can not be transferred into financial flows. If these effects are not a significant output, then basically, the result of the analysis will not be affected, but they should definitely not be omitted and should be adequately described.

## **4 Conclusion**

Despite the growing importance and international initiatives, the assessment of MDs are rarely developed and implemented at the national level [19]. Therefore, the aim of the above methods is to help understand the potential financial impact of introducing a new device into the system with limited financial resources. The actual, resp. the expected value of the key

parameters (population size, treatment costs) is almost always uncertain. In order to assess this uncertainty, the sensitivity analysis should therefore always be carried out, i.e. at least with the indication of the maximum and minimum possible impact on the budget. At present, it is typical to receive a limited amount of data on the benefits/risks, it is difficult to compare prices and costs, it is necessary to evaluate all therapeutic intervention and put more emphasis on "outcomes research", modeling and work with uncertainty

The solution to the decision-making problem of R & D investment in medical devices means a chance to use the advanced economic methods that will facilitate the development of a particular medical device in order to minimize risks and increase the chance of success or economic profitability of the product. This area is closely related to a follow-up health technology management system that takes into account the economic efficiency of medical devices and methods in medical care as such. The combination of the methods proposed above will contribute to the synergic effects of a multidisciplinary approach in the fields of economics, medicine and informatics.

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# Economy of Business Companies in the Traditionally Non-Profit Sector of Social Care Services for the Elderly

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## Abstract

In view of the ageing population, it is necessary to deal with a provision of the social care services for the elderly (SCS). In case that demand for SCS will increase, there is a question how SCS should be ensured. Currently, SCS are mainly provided by the public (non-profit) sector in the Czech Republic, although on the SCS market there are also private organizations, either non-profit or for-profit. For-profit organizations represent nowadays only the minority, but the future of SCS provision could be different. Aim of this contribution is to analyse for-profit part of this market, especially business companies, and to evaluate the attractiveness of the SCS market for entrepreneurs. The contribution explores public available secondary data from the Register of Social Services Providers and the database Albertina. The data are analysed by the quantitative research methods as descriptive statistics, index IN99 or linear regression. Findings show there is no certainty to generate profit on the SCS market, but it is also possible that profit is not the main motive to market entry. On the other hand, it is necessary to use also client's point of view by evaluating of the future role of for-profit SCS providers.

*Keywords: Social Care; Social Care Services for the Elderly; Aging population; For-profit Social Care Providers*

JEL Classification: H44, I11, M21

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## 1 Introduction

This contribution reacts on the demographic development which is typical not only for the Czech Republic but also for many countries worldwide [22]. The trend called "Aging population" brings many tasks and one of them is also provision of social care services for the elderly (SCS). In view of the fact that the proportion of 65 and older people is rising in the Czech society and life expectancy is extending, there is a threat of a lack of SCS in both required quantity and quality [18]. The research in the SCS area is more advanced in other countries, especially in the United Kingdom and the Scandinavian countries. Although there are also issues as SCS financing [19], effectiveness [15], availability [10], management [8], senior's behaviour [21] and others, which are becoming grow in importance in the Czech Republic, this research area should be investigated more.

SCS provision is highly influenced and determined by the Social Services Act [4] in the Czech Republic. This act defines the individual social services and specifies the necessary conditions to SCS provision. Two main financial sources for SCS providers are also regulated by this act, that is state subsidy and social security benefit "care allowance" [19]. Further, the implementing regulation to the mentioned act establishes the upper limit of payments from SCS users. It follows two facts. Firstly, the SCS area is very regulated, providers have to meet the conditions and cannot set prices freely. Secondly, the main financial sources are state subsidy, care allowance, user payments, health insurance company payments and potentially private sources or donations. As it was said, three firstly named are regulated by the act and all of them come from public sources (the elderly use their pensions for SCS payments). These sources should not be wasted and therefore, it is next reason to research.

Previous research has shown that the Czech SCS market is a mixed market, it means that there operate organisations of public (non-profit) sector, private non- and for-profit sector at the same time [12]. This phenomenon is not unique. Marwell and McInerney [13] developed a

five-step theoretical framework of mixed market emergence, which could be called “marketization”. Based on their framework, firstly, non-profit organisations identify a new need (market identification). Secondly, the market is created and if the existence is legitimate, the market grows (market growth). Then it is followed by cost increase and price increase (third and fourth step) and in these phases the market starts to be attractive for for-profit organisations. Last stage should be cross-sectoral competition. Nevertheless, according to the authors, the market does not have to go through all steps. The results of the market analysis suggest that the Czech (residential) SCS market was established in the typical way in compliance with the framework. However, nowadays it is not possible to consider this market as competitive [12].

“Marketization” of SCS is not new development which is based on the theories of Mixed Economy of Welfare and New Public Management. Connection of these theoretical principles in the SCS area is shown in theoretical approach of Čepinskis and Kanišauskaitė [3]. In 1980s, these theories were being implemented in social policies, among the first countries were the United Kingdom, the Netherlands and Sweden [1]. Despite the initial concerns and criticisms [23], [5], this way of providing SCS has expanded and works well to date.

The process of decentralization and marketization was adopted also in the Czech environment, however, it has been delayed by 20 years compared to Western Europe [9] because of political reasons. The crucial importance in the transformation was the adoption of the Social Services Act in 2006 [4]. Although the possibility of market participation of all sectors has been created, their representation is still not balanced. Pfeiferová et. al. [17] estimate that the market share of for-profit SCS providers is around 3% in the Czech Republic. According to my analysis of residential SCS (Retirement homes, Homes with special regime oriented on the elderly with different kinds of dementia), it was shown that the private profit-oriented sector represents over 14% of the market [11]. Even though this proportion is higher it still means that profit-oriented sector accounts for a minority. However, for example in the United Kingdom the situation is quite different, here for-profit organisations represent 74% [2]. Considering the delay of changes adoption, the situation could also change in the Czech Republic.

The growth of demand for SCS is very probable in the near future and there are the questions how the SCS provision will look like and who will ensure them. Although the participation of for-profit organisations on the Czech SCS market is low today, the situation could change and therefore it is necessary pay attention to them. Despite the fact, that the interests and values of public and non-profit organisations on the one side and for-profit (business) organisations on the other side start to converge [14], profit and financial results are still consider as main goal and performance measure of for-profit organisations [6]. Therefore, in order to be possible that the role of for-profit organisations in SCS provision increases in the future, it is essential that these organisations will be profitable, from provider point of view.

This contribution will focus on business companies, that is Limited Liability Companies (Ltd), Public Limited Companies (Plc) and Cooperatives (Co-op), which provide residential SCS. The residential SCS were chosen because Social Services Act defines 11 SCS which are varied and the chosen group should be more homogenous. Aim of the contribution is to find out the answers on these research questions:

- RQ1: Are the business companies on the Czech residential SCS market able to generate profit?
- RQ2: Which factors influence their profitability?

## **2 Data and Methods**

The analysis was based on secondary public available data from the Register of Social Services providers and the database Albertina. On the Czech SCS market operated over 1200 SCS providers in 2016. Business companies represented over 13% (163) of all providers, 68 of them provided residential SCS, that is Retirement homes and Homes with special regime. According to

the Social Services Act, there is one more residential SCS – Week care center, but there was no business company providing this service in 2016.

In Table 1, there is overview of SCS providers by type of residential service. The 68 business companies were the analyzed population. Nevertheless, to answer the RQ1 the sample consists of 53 business companies which had completed financial statements (some data were missing, some data were for shorter period than one year and had to be excluded) and to answer the RQ2 the biggest group of business companies which had financial data per one same year were found and sample was 42 business companies for year 2015. This sample was also used to analysis through index IN99.

**Table 7. Residential SCS by type and samples (Source: Author)**

<b>Residential SCS</b>	<b>Total in 2016</b>	<b>Business Companies (% of Total)</b>	<b>Sample RQ1 (% of Business Companies)</b>	<b>Sample RQ2 (% of Business Companies)</b>
Retirement homes	452	48 (10.6%)	40 (83.3%)	29 (60.4%)
Homes with special regime	71	20 (28.2%)	13 (65.0%)	13 (65.0%)
Week day care	4	0 (0.0%)	0 (100.0%)	0 (100.0%)
<b>Total</b>	<b>527</b>	<b>68 (12.9%)</b>	<b>53 (77.9%)</b>	<b>42 (61.8%)</b>

To answer RQ2, there were identified three potential factors influencing profitability of business companies: length of existence in years as a measure of trustworthiness, size of business companies in number of beds to compare similar business companies and legal form as a sign of the different way of functioning (establishment, managerial decision-making...). In Table 2, there is a basic description of these factors. It was shown that all residential SCS are more than 4 times older than business companies themselves. On the other hand, business companies provide residential SCS in facilities with higher capacity, much higher in case of Plc.

**Table 8. Potential factors influencing profitability (Source: Author)**

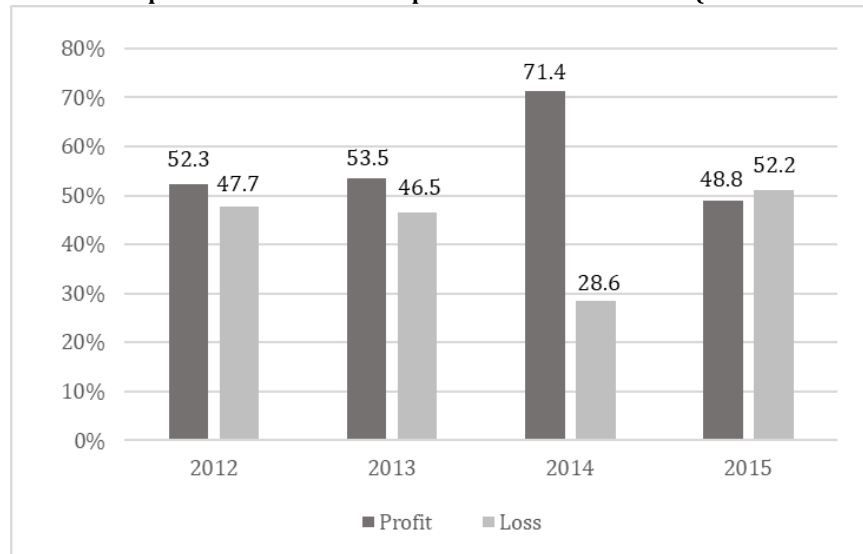
	<b>Total</b>	<b>Average length of existence [years]</b>	<b>Average size [beds]</b>
All residential SCS	527	12.3	72.3
Business companies	68	3.1	92.7
Legal form:			
- Ltd	57	3.8	80.9
- Plc	10	3.5	167.6
- Co-op	1	0.7	14.0

This contribution used quantitative research methods especially descriptive statistics, mentioned Neumaier's index IN99 [16], which attests about financial health of organizations, and linear regression model. The results of the executed analysis are in the next part.

### 3 Results and Discussion

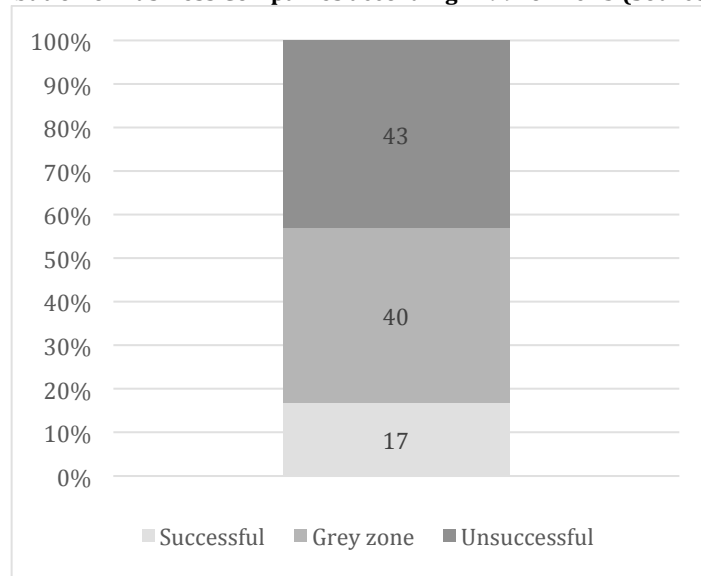
Firstly, the business companies which had generated profit and which had shown loss were compared. On Figure 1, the results of this comparison are shown. Except for year 2014, when the situation was very different and positive from provider's point of view, the results in the other years were fairly balanced. In 2012 and 2013 there were weak predominance of profitable organisations. On the other hand, the loss-making organisations slightly prevailed in the last observed year. The reasons of the difference in 2014 were not analysed but generally, it is possible to state that there is no guarantee of business success (profitability).

**Figure 2. Portion of profitable business companies on the SCS market (Source: Author)**



Secondly, index IN99 was used to evaluate financial health of the business companies. Index IN99 was constructed to accent the owner’s point of view by evaluation of organisation [16] and was applied to more complex evaluation of financial results (not only profit). According to this indicator, there were only 17% of healthy successful business companies on the SCS in 2015 (Figure 2). 43% of business companies were determined as unsuccessful and considerable proportion (40%) were located in so called “grey zone”. The financial situation of these organisations was not clear-cut but grey zone always signals some kind of problems.

**Figure 3. Distribution of Business Companies according IN99 for 2015 (Source: Author)**



Finally, the identified potentially influencing factors of profitability were tested. The linear regression model was constructed:

$$EY = \beta_0 + \beta_1 W + \beta_2 X + \beta_3 Z \tag{1}$$

*W* – length of existence [years]

*X* – size [beds]

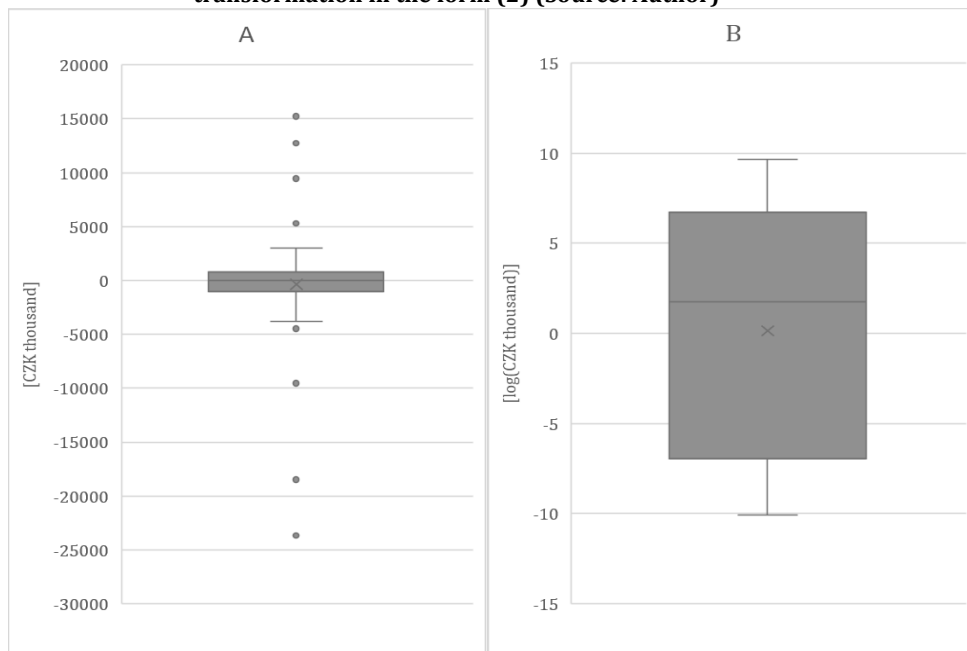
*Z* – legal form [0 – Ltd, 1 – Plc; no Co-op in the sample RQ2]

Before parameters estimation, the transformation of the dependent variable profit was necessary because of many remote values. Sequential logarithmic transformation in the sense of the Equation 2 was done. Figure 3 shows the effect of this transformation.

$$Y = \text{sgn}(\text{profit}) \log(|\text{profit}| + 1) \quad (2)$$

Function  $\text{sgn}(x)$  is equals 0 for  $x=0$ ; -1 for  $x < 0$ ; 1 for  $x > 0$

**Figure 4. Distribution of the profit variable before (boxplot A) and after (boxplot B) the logarithmic transformation in the form (2) (Source: Author)**



In Table 3, there are the estimates of regression parameters and p-values expressing their statistical significance. The results show that only the factor legal form is statistically significant at the 5% significance level. According to this model the legal form Plc decreases profit and therefore the legal form Ltd should be recommend. However, the model's coefficient of determination is low and consequently it is not possible generalised these findings.

**Table 9. Parameters estimates and corresponding p-values (Source: Author)**

Factor	$\beta$	P-value
Length of existence	0.502	0.155
Size [beds]	0.003	0.685
Legal form [Plc]	-6.496	0.012

In summary, the results of the executed analysis show that there is no certainty of profitability on the Czech SCS market for for-profit organisations and only 17% of business companies in 2015 are possible to consider as financial healthy. These findings are in conformity with the Wong [24]. She reported that only 16.9% of residential SCS providers made a profit and 36.9% showed a loss. Additionally, her interviews with the providers found out that for 69% of private „for-profit“ organisations the profit was not the goal of founding their organisation. In view of this statement, it is necessary to change a view on the entrepreneurs' motivation to provide SCS because it seems that profit does not have to influence the attractiveness of the market for private providers or does not have to be the main influencing factor.

Exploring of differences between for-profit and non-profit organisations operating on the same market was popular research topic. Unfortunately, the results of these researches were a little vague [20]. There were not any significant differences between these groups and there

appeared conclusions that these organisations adopt a similar way of the market behavior and begin to look alike during coexistence on the market [7]. It is possible, that these similarities do not arise through the meet on the market but are given before the market entry through the similar motivation to entrance.

#### 4 Conclusion

Due to the demographic development in the Czech Republic and also the other countries, the currency of the SCS provision issue is undeniable. The Czech SCS market is mixed market, it means SCS are provided by both public and private sector (whether non-profit or for-profit). Nowadays for-profit organisations represent only minority on the SCS market. However, marketization of the SCS was delayed compared to Western Europe and therefore it is possible that their role in SCS ensuring will grow in a similar way to the West.

This contribution focused on the business companies which provide residential SCS and analysed their ability to generate profit and the factors which could influence the profitability. It was demonstrated that there is no certainty to generate profit on the Czech SCS market and therefore, it is not possible to make a clear decision whether the business companies will dominate in SCS provision in the future. On the other hand, it is possible that profit is not or not main motive to set up “for-profit” organisation on the SCS market and in spite of the threat of loss-making the market could attract new for-profit providers.

Limitation of the contribution is possible to see in focusing only on profit from financial statements, however the index IN99 takes into account more aspects and should eliminate this limitation. Secondly, more influencing factors could have been identified and for example analysis of pricing or costing could have contributed to better understanding. In order to answer the question if the importance of for-profit organisations in SCS provision will increases, we should find the main motivation of the potential founders and also an answer whether it is actually desirable in terms of quality, availability, social expenses, morale, etc. These topics are suggestions for the further research in this area.

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# Money First? What Actually Affects the Amount of Membership Fees in Non Governmental Non-Profit Organizations?

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## Abstract

Membership fees are one of the attributes of organizations with a membership base; however, the function and role of membership fees hasn't been explored much yet. The present paper attempts to fill the knowledge gap, examining the role of membership fees on a sample of non-governmental non-profit organizations involved in free-time activities. The research is based both on economic and non-economic data allowing for the inclusion of a wider range of factors potentially influencing the amount of membership fees and for the elucidation of their true role. The results of the research indicate the insignificance of certain factors seemingly key for the amount of the membership fee. One of the significant instruments explaining the role of membership fees was their elasticity. Among other things, this instrument disproved the widespread illusion on the relationship between the economic cycle and the amount of membership fees. Based on the data under examination, membership fees mainly play a symbolic role, with their economic aspect being much less significant than as suggested by the literature. Organizations with a membership base use membership fees to identify their members and gather information on active members.

*Keywords: membership fee; non-governmental non-profit organization; membership base; recession*

JEL Classification: L31; D33; G01

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## 1 Introduction

Organizations having a membership base they depend on represent a significant part of non-governmental non-profit organizations (hereinafter referred to as "NPOs") [10]. Thanks to the membership base, organizations can stay on top of the persons using their products and services. Furthermore, the membership base is often an important source of human capital in the process of natural replacement of key players in NPOs [1]. Membership fees are usually considered as economic benefits for membership based organizations, as new sources of income and potential donations from the organization's members [13]. However, not all organizations with a membership base collect membership fees. When NPOs do collect membership fees, their roles in the organizations differ. The generally accepted thesis on membership fees being a significant source of income is verified in this paper and confronted with an alternative interpretation of membership fees as tokens of affiliation with an organization.

The aim of the present paper is to present results (data analysed using economic and econometric analyses) helping to identify the key role of membership fees in NPOs. The object of the research is NPO membership fees and economic and non-economic factors influencing their amount. The circumstances influencing the fees' amount are one of the clues for the identification of the role of membership fees in organizations. Due to a great diversity of membership based NPOs, little research has been carried out on the factors influencing the amount of membership fees. Most frequently, the literature links membership fees and their amount with the financial needs of an organization, or the attempts to diversify the sources of funding [3]. In reality, however, the factors influencing the amount of the membership fee are more complex. The obstacles complicating a more extensive analysis of factors influencing the amount of fees are the great diversity of NPOs and their services and products offered. For this reason, our research is limited to a homogeneous group of NPOs providing the same service and addressing the same group of clients.

The limitations arising from our choice of the sample are mainly connected with the impossibility of a broader generalization of the results. However, our results can at least serve the purpose of supporting the so far unverified statements with data, providing room for additional research activities potentially extending our research or following up on it.

## **2 Material and Methods**

As indicated in the introduction, the data under analysis come from a group of NPOs which are relatively homogeneous. It is thus convenient to use statistical and econometric analyses. The NPOs analysed have specific characteristic described here mainly due to a possible application of some of our results on other groups of organizations as well.

Yet another important part of this section of the article is the introduction of different categories of data and their influence on the amount of membership fees. In this paper, we work with accounting data and non-economic data identified as important for the given NPO data set.

### *2.1 Organizations*

In the non-governmental non-profit sector, as defined for instance by the structural-operational theory [11], membership based organizations are quite common; however, the sector is very heterogeneous for instance in terms of the different missions of the individual organizations. It is thus nearly impossible to examine membership based NPOs across the whole spectrum in one single analysis.

To analyse and understand the role of membership fees, it was therefore necessary to select NPOs that would be comparable at least thanks to similar organizational and membership structures to eliminate the factors potentially distorting the results. Yet another important requirement on the data to be analysed was the finding of a sufficient number of organizations representing a statistically "interesting" sample. The last selection criterion for the organization sample was the availability of data for a period of at least 10 years, with time series being key for an analysis of the influence of economic cycle distortions on the economic situation of organizations.

The NPO sample used in the research included 477 (2015) entities working with the youth. As a result, the organizations target a similar membership base, offer an equivalent product and have to comply with rules strictly specified by the umbrella organization. Based on a mutual consensus, the umbrella organization sets limits, within which the individual organizations independently operate. What was key for our research was the fact that in this homogeneous environment, the organizations have certain freedom in setting the membership fees. The structural unity and at the same time the freedom in this important competence thus allowed for comparing the individual organizations and identifying the key factors having influence on the amount of membership fees.

### *2.2 Material*

The main materials used for our analysis were the accounting data of the individual organizations as described above. The data collected reflect a continuous period from 2004 to 2015. The accounting data analysed included both the balance sheets of the organizations (information on the organization's property and its coverage) and the profit and loss statements (information on the organization's business results). The availability of data for a longer period of time allowed for tracking the changes of key factors and their potential influence on the amount of membership fees. This data was complemented by information on the organizations' structure and local competence (as stated in the materials by the Czech Statistical Office). The selected sample of organizations was thus analysed using accounting data, organizational data and data on local competence.

To increase the explanatory power of the data, the year 2007 data was entirely omitted from the analysis as being incomplete in most cases and as such not worthy of analysis, unlike

the other years. The development in time is thus illustrated in the following diagrams and tables without the above mentioned year. Considering the length of the period under examination, this will not affect the explanatory power of the results of our research though.

The analysed data is reflective of the amount and structure of property, income and expenses of the organizations, their detailed structure and local competence. In regards to the phenomenon under examination, what was of interest to us was which factors, if any, influence the amount of membership fees, and in what ways. Thanks to the longer time period, it was possible to follow how the influence changed over time [7].

## 2.3 Methods

To achieve the desired results with the data set available, both fundamental research methods and mathematical and statistical methods were used. As for the fundamental research methods, general analysis, synthesis and deduction were used. As far as the mathematical methods are concerned, we calculated elasticity. The statistical methods used included correlation analysis and regression model analysis. The reason for using these methods was twofold: they allowed for working with quantitative data and for interpreting the results using simple analytical tools.

### 2.3.1 Fundamental research methods

The basic interpretation methods include analysis, synthesis, deduction and induction. Thanks to these methods, it is possible to interpret the data and values collected and draw conclusions, recommendations and individual findings. Deduction and induction can be considered as problematic. In deduction, the researcher attempts to draw conclusions; however, it is not always possible to tell whether the deduction is based on an actual implication, or whether hidden variables are involved. However, this critical point should be partially eliminated using regression analysis and statistical tests. The weak spot of the generalization of conclusions using induction can lie in an incorrect or even erroneous generalization of the relationship, role or function of membership fees. To eliminate this threat, general analyses can be combined with statistical and mathematical methods to get sufficient data for at least partial generalization of results.

### 2.3.2 Mathematical and statistical analytical methods

A key mathematical method is the calculation of elasticity of membership fees. The elasticity of the fee amount reflects the ability to adapt to the changing demand and is important for the explanation of the role of membership fees. Where the fees' elasticity is low, we can link the role of membership fees with their non-economic nature. On the other hand, a high elasticity of membership fees can point out economic factors, or external economic factors, which might not be elucidated using correlation and regression analyses [2].

The output of a correlation analysis is a matrix showing the relationships between individual variables. This analysis is a basic one only revealing the strength of a relationship, and not its importance. According to a correlation coefficient, we can classify the strength of a relationship into six groups ranging from no correlation, through trivial correlation to perfect correlation [12]. For the purposes of this research, we are interested in relationships achieving a correlation coefficient of at least 0.2, i.e. having a low to medium correlation.

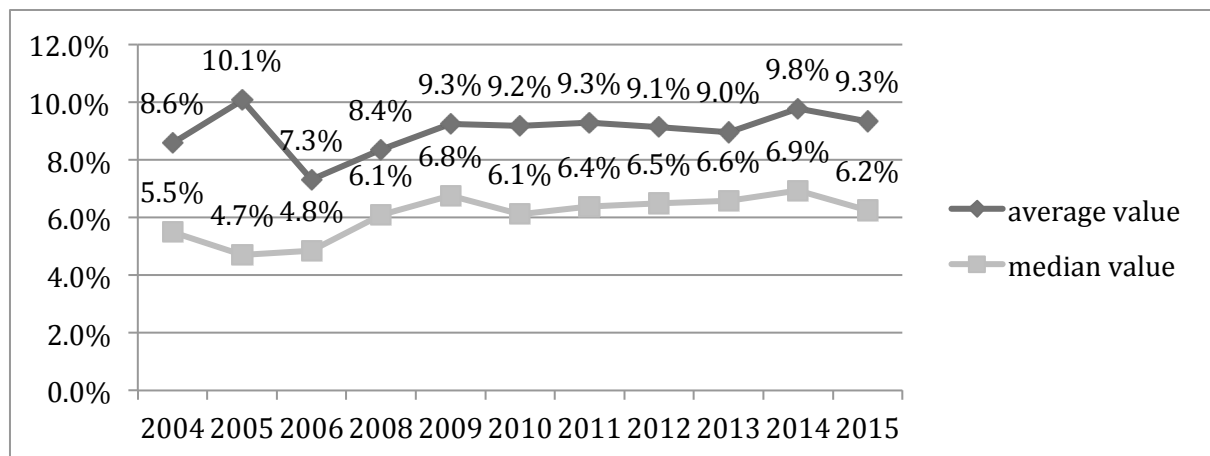
The next step necessary for the interpretation of results is a regression analysis of the relationship providing for another set of indicators. The resulting indicators are essential for establishing the significance of a value and the percentage of a variable explaining the given phenomenon. The above mentioned indicators are the P-value (showing on which level of significance a null hypothesis is rejected) and the R-squared (showing the percentage of the variable explaining the phenomenon under examination).

### 3 Results and Discussion

#### 3.1 Results

In analysing the role of membership fees, we first focused on their share in the total revenues of an organization (Figure 1). The data showed that with minor variations, the share in the total revenues between 2004 and 2015 was on average 9%. When taking into consideration the mean value of the share in revenues, the percentage was above 6% of total revenues, with minor variations. The highest established values rarely exceeded 30% of total revenues; however, these were truly rare cases potentially related with a data error. Based on these findings, first doubts occurred in regards to the role of membership fees as an important source of income, as frequently stated in the literature [5]. According to our findings, membership fees only contribute to the total revenues to a small extent. What contributes much more towards the total revenues are for instance the revenues from other events organized by the organizations (i.e. their own revenues), contributions from self-governing bodies or from the government budget (i.e. subsidies). This is also in line with the commonly mentioned statistics on the general funding of NPOs in the Czech Republic regardless of the presence of a membership base (public funding 65%, own sources 22%, contributions and donations 13%) [8]. The membership fees' role in diversifying the resources cannot be denied [4]; however, the results of our research show that even this role is not so straightforward, considering the general context.

**Figure 1: Participation of membership fee to total revenues (2004-2015) (Source: Authors)**



Another independent indicator followed was the average amount of membership fees from 2004 to 2015, with Figure 2 illustrating the year-on-year growth. During the reference period, the amount of membership fees nearly doubled. Taking into account the increase of average salaries, the indicator reflects the same trend. The increasing salaries are connected with increasing prices, and certain link between these indicators can thus be assumed, in spite of the impossibility to prove their direct relation. In the context of the year-on-year growth of the amount of membership fees, it is to be noted that in the times of recession and economic recovery, no distortions in the trend were observed. This fact itself reflects the low (or no) correlation between the amount of membership fees and the economic cycle [9].

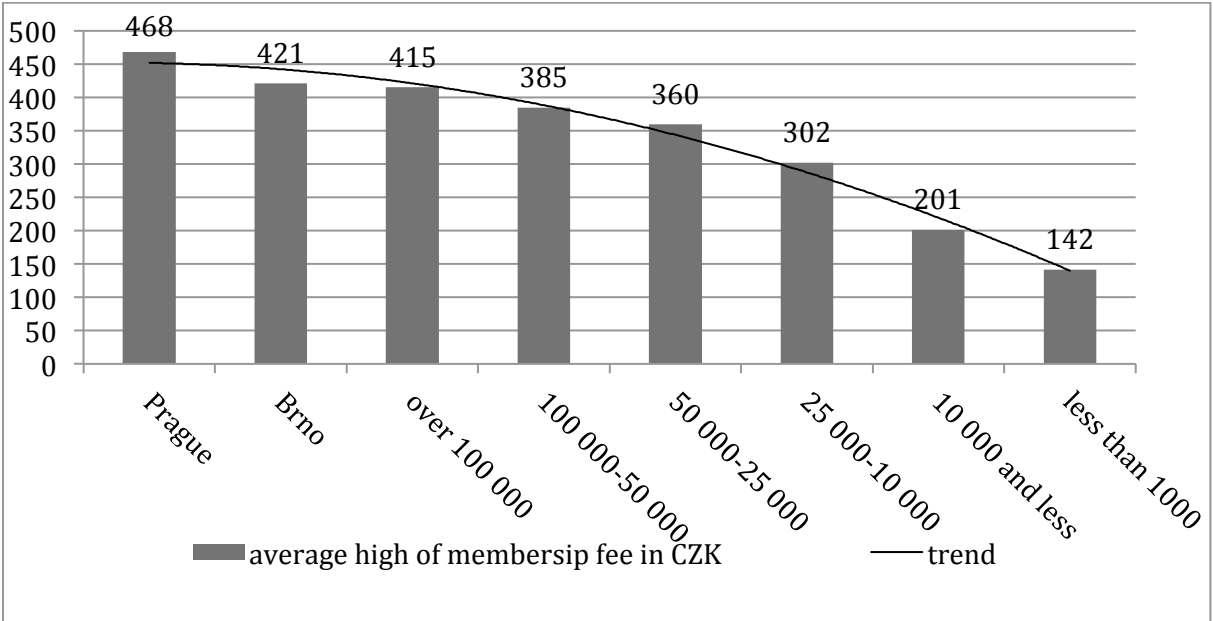
The correlation analysis of economic (accounting data) and non-economic (structure of organizations - number of members, age structure and local competence) values pointed out insignificant relationships (or no correlations) between the individual values. The only correlation having a value above 0.2 (i.e. a low to medium correlation) was the relationship between the size of the organization's place of residence (number of residents of the municipality the organization was based in) and the amount of the membership fee (Diagram 3). There were two specific independent categories in addition to those representing different groups of municipalities: Prague and Brno. The reason was a better illustration of the trend related to the size of the municipality the organization was based in. Logically, the amount of

membership fees was the highest in Prague, then in Brno, and then decreasing together with the size of the organization's place of residence. Membership fees were the lowest in municipalities with fewer than 1,000 residents. The difference between the lowest and highest categories was CZK 324.

**Figure 2: Growth of membership fee and growth of average wage (2004-2015) (Source: Authors and Czech Statistical Office, <[https://www.czso.cz/csu/czso/pmz\\_cr](https://www.czso.cz/csu/czso/pmz_cr)>)**



**Figure 3: Size of organization's place of residence and high of membership fee (Source: Authors)**



In spite of finding a low to medium correlation, no unambiguous claim can be made that the amount of membership fees is derived from the size of the organization's place of residence. The R-squared value was rather low and suggested that the relationship was explained by approximately 7% of the value of the variable. This relationship thus cannot be considered as decisive and it is necessary to continue looking for factors with a higher significance level.

The elasticity of membership fees was calculated as the last step. In absolute values, the elasticity value is  $< 1$  where the membership fees are not elastic and  $1 <$  where these are elastic. The calculation was made for two different periods. When calculated for a longer time period, it is possible to follow elasticity between the individual years. The results showed that

membership fees were not elastic in time, having an average elasticity value of 0.22. The differences between the elasticity of the individual organizations fluctuate between 0.008 and 0.6.

The data gathered in the research and subsequently analysed can be interpreted as follows: the amount of membership fees is a nearly independent quantity, which is not elastic in time and has a slight correlation with the average salary increase and the size of the organization's place of residence.

### 3.2 Discussion

Membership based organizations represent quite a widespread form of NPOs. The economic situation of organizations has been the subject of many papers, mainly dealing with their sustainability and financial health [1]. One of the recurring topics is resource management, fundraising and resource diversification. In this context, membership fees are seen as a potential diversification instrument, or a significant source of income [2].

However, the analysis of a NPO sample outlined above showed that some statements on the role of membership fees are exaggerated, while other ones are underestimated. We can certainly admit that membership fees contribute to resource diversification. However, it is to be added that the share of membership fees in the total revenues is low, with an average value around 9%. This share also suggests that at least in case of the analysed organizations, membership fees didn't represent a significant source of income, rather being an additional one.

It is thus necessary to come up with an alternative explanation of the membership fees' role in membership based organizations. An adequate explanation could be the symbolic role of membership fees, with the fee being a token of affiliation with the organization. This thesis is based on the membership fees' independence of both economic and non-economic indicators and their low elasticity at the same time. Thanks to the membership fee, an organization is able to clearly identify its members and gather the necessary information from them [6]. In turn, the member gains an exclusive access to services he couldn't use without being a member. This thesis is for instance supported by the share of funds the organizations raise from other activities, accounting on average for 50% of total revenues. Comparing the revenues from other activities to revenues from membership fees, it is evident that membership fees play a rather symbolic role. Our research can be concluded by placing less emphasis on the theses on resource diversification and the important role of membership fees, and by contrast by advocating the thesis of the membership fee being an identifier of the members of the given NPO.

## 4 Conclusion

The aim of the present paper was to analyse the economic and non-economic factors of membership fees to establish their role in membership based NPOs. Due to a high diversity of organizations, the research was narrowed down to a sample of homogeneous entities which were mutually comparable and on which statistical methods could be used for a more detailed analysis of internal relationships. The research itself was predominantly based on economic data together with other facts related to the structure and activities of the organizations.

The econometric analysis results only identified one low to medium correlation, which proved to be relatively insignificant though; it was the relationship between the size of the place of residence and the amount of membership fees. The amount of membership fees was either trivially dependent on the indicators (accounting data, structure of organizations – number of members, age structure) followed, or completely independent thereof. What turned out to be a significant value in the analysis was the share of membership fees in the total revenues. The thesis that membership fees serve to diversify the organization's resources cannot be disproved; however, it cannot be deemed the only explanatory factor either. The low share of membership fees in the total revenues suggests that the diversification of resources is rather their side effect.

What seemed to be the most probable was the thesis on the role of membership fees as tokens of affiliation with the organization. In addition to the low elasticity and the established

independence of membership fees of other variables and economic cycles, this thesis is supported by the ratio of total revenues to the revenues from other activities of the organization. Unlike the membership fees, these are a very significant source of funding. Even though the analysis was performed only on a specific group of organizations, it can be inferred that if a membership based organization has similar characteristics to those analysed herein, it is probable that membership fees would only be a symbol – a ticket granting access to products and services offered by the organization.

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# Economic Factors Influencing Crime in the Czech Republic

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## Abstract

Crime in the Czech Republic has decreasing trend; nevertheless, it is very important to deal with it because the number of crimes is at the double level than before 1989. The aim of this paper is to find out whether it would be possible to reduce crime through some economic factors. The regression analysis is used for this purpose. Economic factors entering into model are gross domestic product, inflation and unemployment rate, inequality in distribution of income, average gross monthly wage, public expenditures on safety and public order and expenditures on social benefits. Model is made for total crime, violent crime, property crime and thefts, because various types of crime can be influenced by various factors. Special attention to thefts is induced by the fact that thefts are the most committed offense in the Czech Republic. The goal of the model is to find variables, which can explain behaviour of output variables. The model can be used for prediction of all types of crime.

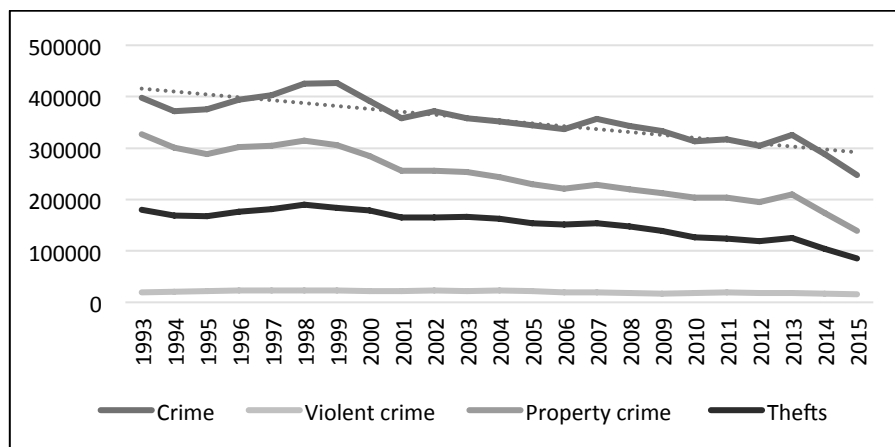
*Keywords: crime; thefts; unemployment rate; social benefits; regression analysis*

JEL Classification: B15, H50, K14

## 1 Introduction

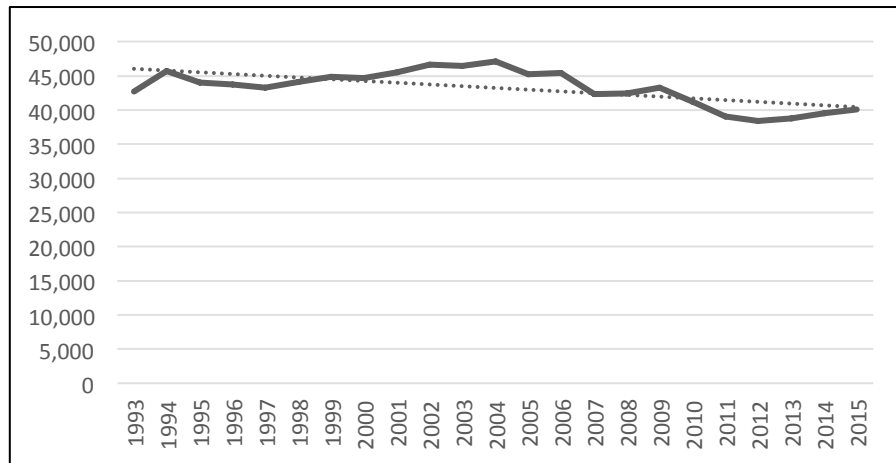
Until 1989, crime in the Czech Republic had maintained at a stable level around 120,000 crimes per year. After 1989, the number of crimes increased for various reasons. The duty to work was abolished. The punishments were alleviated; the death penalty was abolished too. Revenue from crime increased. The President's amnesty of V. Havel took place in 1990. The baby boom from the 1970s (the Husak children) became. Crime in the Czech Republic reached the highest values of around 430,000 in 1998 and 1999 and crime has fallen since (see Fig. 1). A slight increase occurred in 2013 after President's amnesty of V. Klaus. According to experts, Z. Laube and J. Vild, the cause of the decreasing number of crimes are citizen's satisfaction, better economic situation in the country, good property security, good work of police staff and improvement of technical equipment of police. [6] L. Dušek - Czech crime expert - justifies declining crime in the Czech Republic in a different way: "Strong population ages from the 1970s exceeds thirty and a significant decrease in birth rate will be observed, which occurred during the 1990s. Crime can fall without the merit of the police". [22] Nevertheless, it is necessary to deal with crime because the number of crimes now is at the double level than before 1989.

Figure 1. Crime in the Czech Republic during 1993-2015 (Source: Policejní presidium ČR)



The relationship between crime and the number of police is monitored very often. I think that the higher the number of police is the lower crime should be. However, there is a vicious circle. With more police, more offenses are recorded and with increasing number of offenses, more police are admitted. In the Czech Republic, there is about 40,000 police officers and the number of police as well as the number of crimes have decreasing trend (see Fig. 2), although crime decreases faster than number of police. This situation can be explained by the fact that the subject of the investigations is recorded crime. Fewer police will be exposed to fewer criminal offenses. We can see that reduction in crime in the Czech Republic is not the result of growing number of police officers.

**Figure 2. Police staff in the Czech Republic during 1993-2015 (Source: Policejní presidium ČR)**



Crime is considered a complex issue. A number of factors have an impact on crime: historical, social, political, cultural, economic etc. From the point of view of the professional focus of the author, the essay deals with economic factors (the historical and social aspects of crime are mentioned only marginally) and in this context, we can ask: are there any economic factors that could significantly influence crime in the Czech Republic? In accordance with this, the hypothesis can be formulated: it is possible to reduce crime in the Czech Republic through economic factors. Regression analysis is used for this purpose.

## 2 Material and Methods

### 2.1 Literature overview

First opinions on that, economic factors such as unemployment, social inequality and other socio-economic factors influence crime, we can find in the works of A. Smith, J. Bentham or G. S. Becker. In the 1950s the views prevailed that crime is caused by mental illness and criminals are helpless victims of the social environment. "It was considered the society has taken the criminals to their actions, they grew up in unstable conditions and they did not have the opportunity to develop into the healthy individuals. Western society took an almost protective stance towards them." [22] G. S. Becker, the most important representative of the crime economics, did not agree with this opinion and created concept of the rational criminal. According to him, criminals behave rationally. His approach is based on the cost-benefit analysis. Becker argues, "A person commits an offense if the expected utility to him exceeds the utility he could get by using his time and other resources at other activities. Some persons become "criminals", therefore, not because their basic motivation differ from that of other persons, but because their benefits and costs differ". [2]

Currently many authors deal with the relationship between unemployment and crime. S. Raphael and R. Winter, using U. S. state data, found significantly positive effects of unemployment on property crime rates. Their estimates suggest that a substantial portion of the decline in property crime rates during the 1990s is attributable to the decline in the unemployment rate. [17] A. Oster and J. Agell, using data from Sweden during the 1990s, found statistically and economically significant effect of general unemployment on the incidence of burglary, car theft and drug possession. [15] M. A. Andresen, in the Canadian provinces as the unit of analysis, found that both unemployment and GDP matter for crime, opportunity explains more results than motivation, and the strength of either effects depends on the crime type being analysed. [1]

C. C. Hsieh and M. D. Pugh investigate relationship between poverty, income inequality and violent crime. Poverty and income inequality are each associated with violent crime. Their analysis shows considerable variation in the estimated size of the relationships and suggests that homicide and assault may be more closely associated with poverty or income inequality than rape and robbery. [10] M. Kelly found that inequality has no effect on property crime but a strong and robust impact on violent crime, with an elasticity above 0.5. By contrast, poverty and police activity have significant effects on property crime but little on violent crime. [11] J. Brush, using U. S. counties data, found that income inequality is positively associated with crime rates in the cross section analysis, but negatively associated with crime rates in the time-series analysis. [3]

M. W. Burek points to positive relationship between crime and social benefits in Kentucky counties during period of 1980-1990. [4]

## *2.2 Description of the method used*

The aim of the model of regression analysis is to find factors, which have the highest influence on crime in the Czech Republic. The model is made for total crime, violent crime, property crime and thefts. I find this structure suitable considering that various types of crime may be affected by various factors. Special attention to thefts is induced by the fact that thefts are the most committed offense in the Czech Republic. The model can be used for prediction of all types of crime. The input variables are gross domestic product, inflation rate, long run unemployment rate, income inequality, average gross monthly wage, expenditures on safety and public order and expenditures on social benefits. The reporting period is from 1993 to 2015. Input data, except inflation rate, unemployment rate and Gini coefficient, are converted to natural logarithms in order to decrease the inequality of character's distribution, which is typical for economic indicators. Regression analysis is made in MS Excel. Input data are based on sources of the Czech Statistical Office, Ministry of Interior of the Czech Republic and Police Presidium of the Czech Republic.

## **3 Results and Discussion**

### *3.1 Crime and public administration in the Czech Republic*

In the field of public administration several factors exist, that reduce its performance and can lead to danger that public administration will be misused by crime in order to ensure appropriate conditions for the execution of criminal activity, to get information and to ensure impunity. Clear rules and standards of behaviour are not precisely defined in many areas of public administration. Everyone can do what he wants irrespective of the public interest and the need for internal security. Quality and professional preparation in public administration miss and that is why criminogenic factor is insufficient professional preparedness of workers in this area. Low professionalism of state officials may result in inconsistent performance of the function, in careless relationship with confidential information or in relation to corruption. A deficiency that can be misused is the fact, that some posts in public administration are occupied due to acquaintances, favouritism and political influences. As corruption is the main form of

criminal penetration into public administration, it is necessary to make system changes during allocation public contracts and management of public budgets. [5]

Another criminogenic factor that could hinder the optimal development of public administration is politicization. The composition of ministries is dependent on election results. After every election, the whole team is changing and a lack of continuity there is. Distrust of most citizens in the public administration is also a negative factor. Citizens feel a mess, failure to meet basic obligations, incompetence and arrogance of the state officials and other shortcomings. [5]

Regional and local administration has an important role to play in preventing crime at a local level, particularly in reducing of property and violent crime. Protection of public spaces and securing the security and property of citizens are very important in this context. [5]

### 3.2 Economic factors influencing crime in the Czech Republic

*Gross domestic product.* I suppose negative relationship between crime and gross domestic product. Decrease in GDP is connected with drop in salaries, job cuts and increase in unemployment. This means recession in economy. Recession can cause a feeling of insecurity in people and this situation can become a stimulus that leads to illegal activity. With rising GDP, people are richer and give more money to protect against crime (burglar alarms, security locks, guards, counsel). "Some research show a positive relationship between crime and GDP per capita because areas with higher GDP per capita are more attractive to criminals (greater profits from thefts)". [12] I am aware that there is a difference between GDP (it measures the economic power of the country) and GDP per capita (it measures economic level of the country). As only one country is subject to investigation, I did not choose GDP per capita factor.

*Inflation.* Inflation is considered one of the macroeconomic evils. I suppose positive relationship between crime and inflation. Inflation means the decline in the purchasing power of money and the biggest impact is on low-income people who commit most of the criminal offenses. Inflation reduces the real income of people and they want to get more money by illegal activity. Inflation also reduces the alternative cost of crime and from the economics; it is known that when something is cheap, demand is great after that.

*Unemployment.* Unemployment is the most frequently cited factor influencing crime but it is also the most controversial factor. I think that the higher unemployment rate is the higher crime in country will be. People without employment do not have enough money and that is why they commit crime in order to resolve their bad financial need as quickly as possible (motivational theory). [4] "The typical criminal is a person without job and with low income. These people earn more money by crime". [19] The findings of some research are completely the opposite. According to some research, negative relationship between crime and unemployment exist (theory of opportunity). They explain this as follows: unemployed people usually stay at home (they do not go to work regularly) and they better protect property from thieves (reduce a probability of a crime). [4] With the aim of reducing these inaccuracies, I use long run unemployment rate in the model. Long run unemployment is based on the number of unemployed people who were looking for their job more than one year.

*Income inequality.* I suppose positive relationship between crime and income inequality because people can perceive unequal distribution of income as unfair. "People can be frustrated and angry and they can commit crime. This factor can affect rather violent crime than property crime because man who is deprived of lower income he is more likely to resort to violence". [19] Unequal distribution of income is measured by Gini coefficient. Gini coefficient in the Czech Republic has been continuously monitored since 2005 and that is why the time series of Gini is made up of two sources.

*Average gross monthly wage.* In my opinion, average gross monthly wage has also effect on crime. The higher wage is the higher opportunity costs are. Committing a crime requires some time that you could otherwise spend in a job and get legal earn. With every crime, possibility of imprisonment comes and time spent in prison is more expensive for people with higher income.

Wages are also related to education and educated people usually receive higher wages. I suppose that the higher average gross monthly wage is the lower crime will be.

*Expenditures on safety and public order.* The impact of the police sector on crime is expressed through the expenditures on safety and public order. Police should prevent criminal offenses, ensure the safety of citizens, protect their property and investigate criminal offense. It is very important how much money from the state budget points to the police sector. I suppose positive relationship between expenditures on safety and public order and crime. Increase in the expenditures on safety, public order, prevention and wage of police staff leads to decrease in crime.

*Expenditures on social benefits.* This factor is also very controversial as in the case of unemployment. On the one hand, we can suppose that higher social benefits means higher disposable income for households, and people have more money and they do not need to engage in illegal activities. According to this assumption, higher social benefits decrease crime. On the other hand, people receiving social benefits are usually unemployed and they have enough free time they can spend in committing crimes. The *state social support benefits* are included into model. The whole construction of the state social support benefits is derived from the living minimum and the principle of state-organized solidarity is applied in their implementation. [13] The system of the state social support benefits in the Czech Republic is regulated by Act 117/1995 - Act about state social support benefits and its amendments. The following benefits are provided under this act: child allowance, parental allowance, housing allowance, social allowance, birth grant and funeral grant. [20]

### 3.3 Model results

The economic model looks like this:

$$\begin{aligned}
 crime_{it} = f(GDP_{it}, & inflation\ rate_{it}, unemployment\ rate_{it}, Gini_{it}, average\ gross\ monthly\ wage_{it}, \\
 & (-) \quad (+) \quad (+, -) \quad (+) \quad (-) \\
 & expenditures\ on\ safety\ and\ public\ order_{it}, expenditures\ on\ social\ benefits_{it}) \quad (1) \\
 & (-) \quad (+, -)
 \end{aligned}$$

Regression statistics and model significance test for each type of crime are included in Table 1.

**Table 1. Regression statistics and model significance test (Source: Author, [7], [14], [16])**

	Total crime	Violent crime	Property crime	Thefts
Correlation index R <sup>2</sup>	0.86139422	0.84161048	0.92031798	0.87426941
Determination index R	0.742	0.708	0.847	0.764
Adj. determination index R	0.70126315	0.67913902	0.82282496	0.72713863
Average estimate error	0.07027868	0.06959258	0.09032118	0.10579606
Observation	23	23	23	23
Test criterion	18.21447	24.28276	35.05699	20.54234
P-value	8.14E-08	4.46E-06	6.03E-08	3.48E-06

In case of *total crime* correlation index is strong (0.861394). The model can account for 74 % of total crime. The statistically significant variables in the model are long run unemployment, expenditures on safety and public order and expenditures on social benefits. Coefficients of elasticity from the Table 2 indicate that reduction in total crime could be reached with decrease in unemployment rate, increase in expenditures on safety and public order and decrease in expenditures on social benefits.

**Table 2. Total crime (Source: Author, [7], [14], [16])**

	<b>Coefficients</b>	<b>P-value</b>	<b>t Stat</b>
Constant	10.1059932	9.0501E-06	5.99629225
<i>Long run unemployment</i>	0.02924936	0.06563021*	1.95361909
<i>Expenditures on safety and public order</i>	-0.3898621	2.7633E-05***	-5.4782713
<i>Expenditures on social benefits</i>	0.52777635	0.01825335**	2.58250637
GDP	-1.0827518	0.15430621	-1.5002356
Inflation	0.00795889	0.29420809	1.08697163
Average monthly wage	0.81558069	0.18596669	1.38613552
GINI	1.90347714	0.40763598	0.85195484

\*indicates level of significance to 10 %

\*\*indicates level of significance to 5 %

\*\*\* indicates level of significance to 1 %

In case of *violent crime* correlation index is also strong (0.841610). The model clarifies 70 % of violent crime and statistically significant variables in this case are long run unemployment and expenditures on safety and public order. It means that reduction in violent crime could be reached with decrease in unemployment rate and increase in expenditures on safety and public order.

**Table 3. Violent crime (Source: Author, [7], [14], [16])**

	<b>Coefficients</b>	<b>P-value</b>	<b>t Stat</b>
Constant	11.48638736	3.3164E-22	48.41951247
<i>Long run unemployment</i>	0.063418279	0.00033594***	4.316161083
<i>Expenditures on safety and public order</i>	-0.232668762	1.1237E-06***	-6.87093070
GDP	-1.056607194	0.1680756	-1.44843638
Inflation	0.000387024	0.9589838	0.052294861
Average monthly wage	0.879163885	0.1600165	1.478304437
GINI	2.546962948	0.2771059	1.127838264
Expenditures on social benefits	0.23032095	0.3328213	1.000745238

As to *property crime*, correlation index is very strong (0.920318). This model can explain 84 % of variability of the property crime variables. Statistically significant variables in the model are gross domestic product, long run unemployment and expenditures on social benefits. So, it is possible to decrease property crime through increase in GDP, decrease in unemployment rate and decrease in expenditures on social benefits.

**Table 4. Property crime (Source: Author, [7], [14], [16])**

	<b>Coefficients</b>	<b>P-value</b>	<b>t Stat</b>
Constant	12.6438581	3.39278E-06	6.465017952
<i>GDP</i>	-0.75658742	4.09625E-06***	-6.373933754
<i>Long run unemployment</i>	0.050194903	0.022708558**	2.479304587
<i>Expenditures on social benefits</i>	0.539734133	0.052574826*	2.067575562
Inflation	0.011812017	0.201871196	1.334731337
Average monthly wage	1.302868113	0.086868408	1.832076397
Expenditures on safety and public order	-0.260773311	0.209648367	-1.310774643
GINI	2.58315888	0.353940245	0.956586837

In case of *thefts*, correlation index is strong (0.874269) and this model explains 76 % of thefts. Statistically significant variables are the same as in case of the property crime. It is about GDP, long run unemployment and expenditures on social benefits. To reduce the number of thefts, it is necessary to increase GDP (raising GDP by one percent will lead to a decrease in thefts by 0.8 percent), decrease unemployment rate and decrease expenditures on social benefits (raising expenditures on social benefits by one percent will lead to a decrease in thefts by 0.8 percent).

**Table 5. Thefts (Source: Author, [7], [14], [16])**

	Coefficients	P-value	t Stat
Constant	9.87721974	0.000376246	4.311664625
<i>GDP</i>	-0.80894469	1.32357E-05***	-5.818183191
<i>Long run unemployment</i>	0.08544886	0.001894305***	3.60326897
<i>Expenditures on social benefits</i>	0.79032304	0.018169175**	2.584677043
Inflation	0.01073369	0.361648	0.94093013
Average monthly wage	0.86304986	0.361369	0.941493371
Expenditure on safety and public order	-0.19826143	0.451469	-0.773110169
GINI	2.58102826	0.469848	0.741488291

#### 4 Conclusion

This paper shows that it is possible to reduce crime in the Czech Republic through economic factors such as long run unemployment, expenditures on safety and public order or expenditures on social benefits and that is why the assumed hypothesis is confirmed. Property crime and thefts are identically affected by unemployment rate, gross domestic product and social benefits. This result is logical because thefts account for a significant part of property crime (about 60 %). Coefficients of elasticity get the highest values in case of thefts; it means that through statistically significant economic factors it is possible to influence thefts the most.

In case of social benefits, the coefficients of elasticity are positive, indicating that rising expenditures on social benefits will result in higher crime rates. In accordance with the results of other authors, it can be explained in three ways. Firstly, people receiving social benefits are poor and this group of people commits crimes most often. [8] Secondly, people receiving social benefits have a lot of free time, which could allocate arbitrarily, for example for illegal activities. [21] Thirdly, the higher benefits people receive the more attractive for thieves they are. [18] Expenditures on social benefits are not statistically significant only in case of violent crime.

As to unemployment, most authors in their researches confirm the predominance of motivational theory. I have come to the same conclusion in my model. According to this theory, the higher unemployment rate is the higher crime in the country will be.

Within my future work, I would like to make the same analysis at regional level within the Czech Republic. It would be also useful to extend the analysis of historical, cultural and social factors on the sample of countries with the similar level of GDP per capita. I think that great possibilities for further work within this topic exist.

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# Analysis of Basic Features of Education Systems and Their Influence on the Results of PISA 2015 and PIRLS 2016 Research in European OECD Countries

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## Abstract

Education systems in the world are diverse. This diversity is due to different historical developments and various economic, social and political conditions in the individual countries. Nowadays countries often get inspiration from comparison with foreign countries in finding solutions to various problems in school education. Frequently, international comparative studies on educational systems are emerging which aim not only at comparing the learning outcomes of pupils in individual countries but also to describe some features of the functioning of educational systems. The aim of this paper is to analyze the impact of educational system indicators on the results of PISA 2015 and PIRLS 2016 research in the European OECD countries. For this purpose, we use correlation and regression analysis. However, the diversity of education systems makes this comparative analysis difficult and it is necessary to take into account the specifics of the education systems in each country.

*Keywords: education systems; PISA; PIRLS; student results; indicators of education systems*

JEL Classification: I210, I240, I280

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## 1 Introduction

Countries often draw inspiration when they are compared with other countries to find solutions to various problems persisting in their educational sector. International comparative studies of education systems have become common recently. According to Průcha [15] in these comparisons, however, countries are met with the lack of knowledge about the overall educational system, the historical continuity, the continuity of the individual levels of education, and can lose serious connections between different systems.

European education systems are very diverse. OECD [12] states that the internal conditions of each education system are very different, geared to the educational objectives, curricula, economic, demographic and situational conditions of schools, nationality and their cultural values. The differences are mainly in the extent and length of studies at each type of school, the age limit of entering and leaving the school, etc. In spite of this diversity, however, some common features can be found, for example through the joint development of political and economic clusters or language regions, by a certain global development of education in the world, depending on the needs of the labor market and also identical principles and efforts to harmonize education in the European Union.

In order to compare and evaluate education systems in countries, a classic approach is to consider differences in results obtained for different countries (with regard to various 'products' of schooling such as students that acquired knowledge or their attitudes) and relate them to the structural characteristics of the various educational systems. This allows testing of the possible influence of one or another characteristic. Student' results in international comparative studies are currently considered to be the most prominent indicators of the quality of education systems. Education is a public service and this service is substantially funded from public resources. It is therefore important to use these resources efficiently to improve the quality of education which is the task of the public sector.

One of the first authors who dealt with quality of education was Barro [1]. He approximated the quality of education with the ratio of students to teaching staff. He came out of the hypothesis that the more children come to the teacher, the lesser the quality of teaching the

teacher is able to provide. Hanushek and Kimko [5] do not consider this indicator to be important and state that the quality of education is measured only by cognitive skills of pupils. Cognitive skills (most often detected by PISA results) are widely used in other studies listed below. These studies further outline the indicators that most affect them, such as number of instruction hours or average class size. Duru-Bellat and Suchaut [3] explored the relations between student scores and a number of institutional characteristics of countries' educational systems (such as number of instruction hours, system selectiveness or structure of secondary education). Vintila, Onofrei and Gherghina [19] used comparative analysis to create aggregated indicator towards the assessment of European education systems. Or Lassibille and Gomez [9] determined the degree of differentiation of schooling systems for a sample of countries.

The aim of this paper is to evaluate the impact of educational system indicators on the results of PISA 2015 and PIRLS 2016 research in the European OECD countries. Data processing is performed by statistical methods: correlation and regression analysis.

Such results of international studies have an increasing impact on designing national educational policies, as they reveal some weaker points in school education. Moreover, given the attractiveness of these international surveys for the media, the results of these studies are also an incentive for public debate on the problems of education in the national context [12].

## **2 Material and Methods**

Our source of information was the results of PISA (Programme for International Student Assessment). Its aim is to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old pupils (near the end of their compulsory education). This project assesses the extent to which pupils have acquired key knowledge and skills that are essential for their full participation in modern societies. The assessment focuses on the core school subjects of science, reading and mathematics. We used the latest results of PISA conducted in 2015 [13]. Approximately 540 000 pupils completed the assessment this year, representing about 29 million 15-year-olds in the schools of the 72 participating countries and economies.

The next data we used is PIRLS (Progress in International Reading Literacy Study). The PIRLS target population is the grade that represents four years of schooling, counting from the first year of ISCED Level 1, which corresponds to the fourth grade in most countries. PIRLS provides internationally comparative data on how well children read by assessing students' reading achievement. There were 50 countries in the latest PIRLS 2016 [6]. About 319 000 pupils participated in it and nationally representative samples of approximately 4 000 pupils from 150 to 200 schools.

The data on the characteristics of education systems was obtained through the annually published study *Education at a Glance* [12]. This study provides key information on the output of educational institutions, the impact of learning across countries, the financial and human resources invested in education, access, participation and progression in education and the learning environment and organization of schools. For this purpose study uses indicators of education systems. For our analysis we chose some of these most common indicators that are used to describe education systems (see studies above). Selected indicators examine in particular the effect on PISA results and PIRLS results. We have divided some of these indicators into indicators of primary and lower secondary education where indicators of primary and lower secondary education examine the effect on PISA results and indicators of primary education examine the effect on PIRLS results. Other indicators are common to both groups of pupils (see Table 2).

The mean score of participating pupils in PISA 2015 and PIRLS 2016 in the European OECD countries shows table 1.

**Table 1. Performance in PISA 2015 and PIRLS 2016 (Source: Authors based on [13], [6])**

Country	PISA 2015			PIRLS 2016	
	Science	Reading	Mathematics	PISA mean	Reading
<b>OECD average</b>	493	493	490	492.00	545.65
<b>Estonia</b>	534	519	520	524.33	-
<b>Finland</b>	531	526	511	522.67	566
<b>Slovenia</b>	513	505	510	509.33	542
<b>Ireland</b>	503	521	504	509.33	567
<b>Germany</b>	509	509	506	508.00	537
<b>Netherlands</b>	509	503	512	508.00	545
<b>Switzerland</b>	506	492	521	506.33	-
<b>Denmark</b>	502	500	511	504.33	547
<b>Norway</b>	498	513	502	504.33	559
<b>Poland</b>	501	506	504	503.67	565
<b>Belgium</b>	502	499	507	502.67	525
<b>United Kingdom</b>	509	498	492	499.67	559
<b>Portugal</b>	501	498	492	497.00	528
<b>France</b>	495	499	493	495.67	511
<b>Sweden</b>	493	500	494	495.67	555
<b>Austria</b>	495	485	497	492.33	541
<b>Spain</b>	493	496	486	491.67	528
<b>Czech Republic</b>	493	487	492	490.67	543
<b>Latvia</b>	490	488	482	486.67	558
<b>Italy</b>	481	485	490	485.33	548
<b>Luxembourg</b>	483	481	486	483.33	-
<b>Iceland</b>	473	482	488	481.00	-
<b>Hungary</b>	477	470	477	474.67	554
<b>Slovak Republic</b>	461	453	475	463.00	535
<b>Greece</b>	455	467	454	458.67	-

Note: arranged in descending order according to PISA mean

Data obtained from the above sources were analyzed by the statistical methods: correlation and regression analysis. According to StatSoft [18] the correlation analysis is used to determine the force of linear dependence between variables. The Pearson's correlation coefficient (the most used numerical characteristic of the statistical dependence of two quantitative characters) was performed in this paper. Regression analysis is used to describe the dependence of two or more numerical variables. It is a mathematical model that is expressed by a regression function. Depending on the number of independent variables, theory distinguishes between models of simple regression and multiple regression. Simple regression describes the dependency of the explained variable on one independent variable (one regressor). In contrast, multiple regression describes a situation where the dependent variable depends on more than one regressor. Dependent variables are in our case indicators of education systems and independent variables are PISA and PIRLS results. Therefore, we used the multiple regression model (we had two regressors). The multiple regression model has the form [8]:

$$Y_i = \beta_0 + \beta_1 \beta_{i1} + \beta_2 \beta_{i2} + \dots + \beta_k \beta_{ik} + \varepsilon_i. \quad (1)$$

### 3 Results and Discussion

First, we performed correlation analysis. The results are shown in table 2. The correlation coefficients may take values within the interval  $<-1; 1>$ , with the value 0 indicating that the relationship between the variables is not correlated, and the closer the value to 1, there is a greater dependence between the variables under consideration [8]. The correlation coefficient was determined for 95 % confidence intervals. Table 2 shows the selected indicators of education systems and their impact on the results of the two mentioned programs - PISA 2015 and PIRLS 2016.

**Table 2. Impact of selected indicators on PISA 2015 and PIRLS 2016 results (Source: Authors (created in the program Statistica 10))**

Indicators	PISA 2015	PIRLS 2016
Expenditure on educational institutions (% of GDP) - primary education	0,385	0,184
Expenditure on educational institutions (% of GDP) - lower secondary education	0,193	
Average teachers' salaries (in USD) - primary education	0,073	-0,221
Average teachers' salaries (in USD) - lower secondary education	0,068	
Enrolment rates in early childhood (age 3)	-0,106	-0,454
Expenditure on early childhood educational institutions (% of GDP)	0,443	0,349
Number of grades that are part of compulsory education	0,356	
Starting age in compulsory education	<b>0,528</b>	-0,094
Ending age in compulsory education	0,036	
Instruction time in lower secondary education (total number of hours science, reading and mathematics per year)	-0,148	
Reading, writing and literature in primary education (as a percentage of total compulsory instruction time)	-0,395	<b>-0,846</b>
Average class size - primary education	0,172	<b>-0,587</b>
Average class size - lower secondary education	0,104	
Ratio of students to teaching staff - primary education	0,014	<b>-0,666</b>
Ratio of students to teaching staff - lower secondary education	-0,275	

From the results of the correlation coefficients, it can be seen that the starting age in compulsory education is statistically significant for the PISA result (0,528). It means that the higher the age of entry into compulsory education, 15-year-olds pupils achieve better results in core school subjects. The following countries have low average age of 5 years: Greece, Hungary, Latvia, Netherlands, Poland, Switzerland and United Kingdom. In the case of Luxembourg, children start compulsory education even at the age of 4. Most of these countries actually achieve worse performance in PISA (see table 1). In terms of the best performers Finland and Estonia, their children start compulsory education at the age of 7 [12]. This trend is the opposite for pupils at the fourth grade (the lower the age of entry into compulsory education, pupils should achieve better results in reading), but the correlation coefficient is nearly 0.

For the PIRLS result are statistically significant for reading, writing and literature hours, average class size and ratio of students to teaching staff in primary education. Very unexpected is the finding that the more teaching hours countries spend on reading, the lower PIRLS result their pupils achieve (-0,846). Ireland, Finland and Poland (the best performers in PIRLS) have around 20 % share of this subject in the total teaching. France, Belgium and Spain (the worst performers in PIRLS) have this share of 30 % [12]. What is not surprising but generally accepted is the finding that a lower class size and lower ratio of students to teaching staff leads to better results of students. But this relationship has not been proven much in terms of PISA results (statistically insignificant correlation coefficients).

For these indicators listed above their statistical dependence was confirmed. The dependency of these indicators is also verified by the regression analysis. This analysis determines how great impact these indicators have on the results of PISA 2015 and PIRLS 2016. Regression models are inserted into variables (indicators) that have been flagged as statistically significant in the previous analysis. For this analysis, a multiple linear regression model is used. The resulting value of the determinant coefficients for the PISA 2015 is 0,169266 and for PIRLS 2016 is 0,382544.

The results conclude that these indicators, which are statistically significant, explain the model from not too high percentage. In the case of PISA, the model of the indicators is influenced by nearly 17 %, and PIRLS is affected by statistically significant indicators from 38.25 %. There is a relationship that the more explanatory variables, the stronger the dependence of the variables. That is also the reason why the value of the coefficient of determination is higher for PIRLS (3 statistically significant indicators) than for the PISA (1 statistically significant indicator).

The OECD [13] states that often-mentioned benefit of smaller classes or student-teacher ratio is that teachers can dedicate greater attention to individual students, especially to those who need academic support the most. However, the relationship between smaller class size/student-teacher ratio and student achievement often has not been proven by studies. Therefore, this relationship should be interpreted with caution, given that some education systems may be reducing the size of classes, or the student-teacher ratio, in an effort to tackle low performance. But the low number of pupils in the class may not lead to their better results. In addition, schools with lower achievement often have difficulty in retaining or attracting good students, which could affect their overall academic performance. The results of our research also did not convince us of the unequivocal relationship between these indicators.

Very remarkable was the finding that higher teaching hours did not mean better results of students. Marzano [10], Patall, Cooper and Allen [14] suggest that increasing learning time can improve academic achievement, for instance by giving teachers and students more opportunities to cover the curriculum, repeat material, provide or receive feedback and engage in hands-on activities. However, Patall, Cooper and Allen [14] admit that more learning time does not necessarily result in better student outcomes, and it can actually lead to fatigue and boredom among students and burnout among teachers. Gromada and Shewbridge [4] perceive as a key question how the allocated instruction time translates into actual lesson time, engagement time and, ultimately, into productive or actual learning time.

As a statistically insignificant indicator proved in our research is the indicator of expenditure on educational institutions. A first glance at PISA and PIRLS results gives the impression that students in high-income countries and countries that can and do spend more on education – perform better. Table 3 shows that this is not always the case (compared expenditure on primary and lower secondary education with the ranks that countries reached in PISA and PIRLS).

**Table 3. Expenditure on educational institutions as a percentage of GDP in the sum for primary and lower secondary education in 2015 (Source: Authors based on [12])**

Country	Expenditure (% GDP)	Rank	
		PISA	PIRLS
Denmark	3.4	8.	10.
Iceland	3.4	22.	-
Norway	3.1	9.	4.
United Kingdom	3.1	12.	5.
Portugal	3.1	13.	17.
Slovenia	2.6	3.	13.
Ireland	2.6	4.	1.
Finland	2.5	2.	2.
Switzerland	2.5	7.	-
Belgium	2.5	11.	19.
France	2.5	14.	20.
Sweden	2.5	15.	7.
Netherlands	2.4	6.	11.
Poland	2.4	10.	3.
Latvia	2.4	19.	6.
Estonia	2.1	1.	-
Austria	2.1	16.	14.
Spain	2.1	17.	18.
Luxembourg	2.1	21.	-
Germany	1.9	5.	15.
Slovak Republic	1.9	24.	16.
Italy	1.8	20.	9.
Czech Republic	1.7	18.	12.
Hungary	1.2	23.	8.

Note: missing data for Greece

For example, Iceland and Hungary rank are very similar (22. and 23.), but the expenditure in Iceland is more than 60 % greater than that in Hungary. Similarly, although countries might have similar levels of expenditure on education, they can perform very differently. Denmark has the highest expenditure but average results. Whatever the reason for the lack of a relationship between expenditure and learning outcomes, at least in the countries with larger education budgets, excellence in education requires more than money.

Other noneconomic factors, therefore, affect student results. It is pedagogical, social, cultural factors or the organizational structure of schools. Countries that have a large degree of selection and external differentiation at an early age (Germany, Austria, Lichtenstein, Czech Republic, Hungary and Slovakia) have generally worse results of students than comprehensive systems (Scandinavian countries and most other European countries). As an example, Průcha [15] states the case of the Czech Republic and Finland. In the Czech Republic (country with a high degree of selectivity), there are significant differences in educational results between schools within the national education system, in Finland these differences between schools are small. Students in Finland attend the same type of non-selective school as opposed to Czech students who are divided after the 5th and 7th grades of the elementary school and are then educated in different types of schools.

Finland has achieved long-term excellent results in international comparisons of educational results. The main principle of education policy in Finland is the provision of equal

educational opportunities for all (not primarily support for the most talented students). The philosophy of equality and justice is dominant for Finnish education policy. This is related to the high care of students with learning difficulties in order to get to the level of the other classmates as soon as possible. Their effort is greater that there are no special schools in Finland, only special classes [15]. Other reasons for the Finnish success according to Simola [16] are excellent teachers and high-quality teacher education. Teachers in Finnish schools have higher status than in most other countries. Student discipline is also significant. The British Evaluation Group, when observing Finnish schools, stated the following: *“Without exception the schools appeared as calm, secure places for pupils to work. Finnish pupils seemed generally well behaved; problems of order and discipline were few and confined to individuals or small groups. (...) There appeared to be concern for others, and respect for property. Teachers’ relationships with pupils generally demonstrated caring and mutual respect, and there was little sense of teachers needing to exercise strict discipline or authority.”* [Norris et al., 11, p. 39].

Estonia reached the first place in the PISA 2015 survey. Finland and Estonia also provide equal educational opportunities for all. As Ježková et al. [7] state Estonia also has high-quality teachers and high-quality teacher education. The greatest care is taken by professional training, where teachers have to spend the most time on their professional development from all monitored countries [12].

As stated above, both Finnish and Estonian teachers have a high status in society. The analysis made by Boček [2] shows that these teachers are among the best-paid people with higher education in their countries. On the other side is the Czech Republic. Czech teachers are the worst paid of all the developed OECD countries.

Important factor affecting student results is also socio-economic background of students. It has been proven many times that lower education of parents or lower incomes result in worse student performance [1], [17].

#### **4 Conclusion**

Our correlation analysis showed that statistically significant indicators that affect pupil performance are: starting age in compulsory education, number of teaching hours and also average class size and ratio of students to teaching staff. We found that it is not good to burden pupils and also teachers with too many lessons and it is usually better to start compulsory education at an older age. Furthermore, it is not crucial to spend more public funds on education and it may not always be true that lower the number of students in the class makes their results better. According to the regression analysis, the used indicators explain the results of pupils only from a small percentage. That means there are other factors that affect pupil results or that these factors affect each country differently. For example, out-of-school factors such as the pupil's socio-economic environment, parental income or parental education. These factors also have a significant impact on pupil results. Set of our results, which meets a certain consensus among educational researchers, should serve for deeper and more comprehensive analysis in the future. It turns out that indicators that are commonly used to assess the quality of education are not entirely conclusive. Quality should not only be measured by PISA results (although it is the most used and methodologically sophisticated tool for measuring cognitive skills). Other factors indicate quality, such as the success of admission to upper secondary school (college or university) and its completion, unemployment of graduates, their wages and other socio-economic conditions. It will be necessary to deal with the individual conditions in countries without whose knowledge the conclusions about the quality of education would be inaccurate. Our further research will focus on these issues.

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# Health Care and Its Geographical Disparities in the Czech Republic. Where Are We Going?

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## Abstract

Ensuring equal access to health care is an important public policy goal. The main goal of this paper is to analyze the geographical distribution of the health care in the Czech Republic. Then we try to evaluate the goals of health policy in relation to improving equal access to health care in the Czech regions, firstly from the view of central government and health insurance companies, secondly from the view of the individual regions. The analysis is divided into two subsections. The trend in regional distribution of the health care was analyzed quantitatively on the data for the period 2000 – 2015 and the level of distribution of health-care services are discussed in the first part. The results of the presented analysis show substantial inequalities. In the second part, we focus on the central governments activities and the activities of the government's of selected regions. We try to focus on the issue, if regions aim to improvement of the equity in access to health care. For this purpose, we analyzed strategic documents of the government and of the selected regions. We have not found evidence that government of the regions with lower access to health care in its health policy aims at its improvement.

*Keywords: health economics; resource allocation; ethics of regional health care finance; capitation systems*

JEL Classification: I130, I180

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## 1 Introduction

Unbalanced distribution of health personnel between and within countries is a worldwide, longstanding problem [4]. If this problem is related to the public policy, we can term the ensuring of equal access of the health care as an important public policy goal [19, 25]. Since 2000, the number of physicians per capita has increased in all EU Countries and The Czech Republic is not an exception [17]. But in our paper we argue, that the trend is not steady among the regions of the Czech Republic. Governments should do more to improve the ensurement of so that everyone has the same access to quality healthcare, wherever they live [15].

Considering Health sector, the social background of the equity is a common theme of academic studies aimed at the equity in access to health care [20, 3, 25, 6, and 22]. But further the equity can be understood from the geographical point of view and this kind of academic studies is rather rare. A fair geographical distribution of services should be one of the health policy objectives in the health system, no matter, if the health sector is based on taxation, on Bismarck „mixed “model based on insurance system with a mixture of public and private providers, or on the private insurance model (e.g. US). The case of the mixture model is the Czech Republic, where after 1989 the Czech Republic and Slovakia, similarly to more or less all post-communist countries decided to switch from general taxation model. The Health care in the Czech Republic is based on the compulsory health insurance for the whole population; the provision is paid with a public or private provision. The right to health-care is constitutionally guaranteed [12]. The outpatient care, which this paper especially concerns, is provided by independent practitioners, the clear majority of them are private. The health insurance companies are the key player in the Czech's health care system, they receipt public health insurance funds and through contracts with providers they pay for consumed services.

The empirical findings show that that unequal distribution of service is often a problem [8, 5, 7, and 25].

The economic literature frequently focuses on the important aspect of the health sector: the regional aspect in the inequalities in access to health care. This article investigates both

geographical aspect of the disparities among the regions of the Czech Republic and analysis of the policies made to improve the inequalities. Our research questions were:

Is the health care equitable in the Czech Republic?

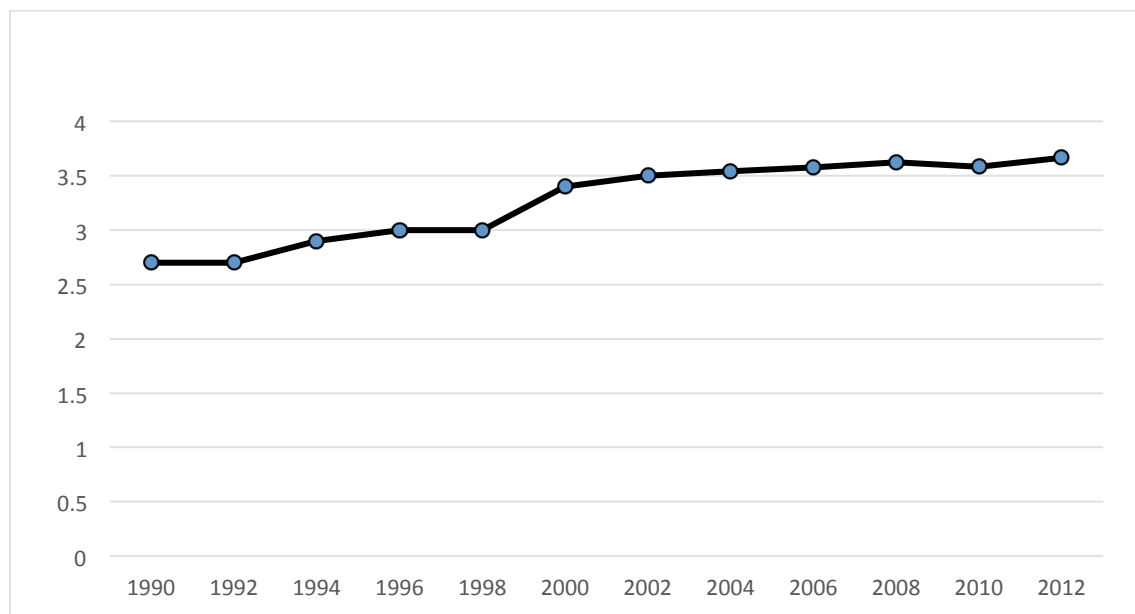
Which activities does the Czech Government make to improve the disparities?

The paper is structured to present the answers to these research questions. The first part of the paper provides data about the amount of the outpatient physician in individual regions. The second part aims at the health policy pointed at the activities of the central governments, health companies and the governments of the individual regions to improve the situation.

Regarding the method used in previous research when making comparison of geographical availability of health care in selected regions, Change [8] describes the inequalities in geographic distributions of paediatricians in the United States, with Lorenz curves and Gini indices. A similar kind of research was later made by Horev [7]. Wilkinson [26] use a Robin Hood Index to describe the distribution of general practitioners in States and Territories of Australia in all above-mentioned cases the comparisons are made across the time periods.

The number of the outpatient physician in the Czech Republic from 1990 to 2012 describes Figure 1. we can observe increasing trend between 1990 – 2000 (increase from 2.7 physicians per 1 000 in 1990 to 3.4 physicians per 1 000 in 2000). Period from 2000 – 2010 is characterized with stagnation (move from 3.4 physicians per 1 000 in 2000 to 3.58 physicians per 1 000 in 2010).

**Figure 1. The Number of outpatient Physicians per 1 000 capita (Author, based on data)**



Only one study has documented a supply of outpatient services and their geographical distribution in the Czech Republic. It was found, that the supply of outpatient services is unevenly distributed [2], even if the solving inequalities was not the primary and the only goal of the study. For the measurement of inequalities, the author used the absolute range, the relative range, the Gini coefficient and the Robin Hood index, where the absolute range and relative ranges are simple indicators based on the extreme values. The Gini coefficient takes into account all observations – it is a measure based on the Lorenz curve. As a population need the author used the population. We decided to use a similar approach. The objective of our paper is to analyze the geographical distribution of the health care in the Czech Republic in the year 2003 and 2013. We do not only examine the state in one year, but we furthermore try to describe the development over ten years. From the result we identified relatively undersupplied regions and then we try to find an evidence if governments of less supplied regions do realize their disadvantages and do formulate a policy towards a better supply of the health care.

## 2 Material and Methods

In this section we provide the description of used methods and we characteristic the data used. Data on the location of general practitioners were obtained from the Institute of Health Information and Statistics of the Czech Republic. The Institute is an organizational component of the State. The data from the “Health Care in the Středočeský (resp. Jihočeský,) Region 2003 (resp. 2013) “, [24] were extracted, tabled, and used for the research. The number of physicians includes both those with independent practices and those from hospital department (outpatient hospital care).

**Table 1: Regional Distribution of Outpatient Physicians, absolute numbers (Source: Author based on data)**

Region	Population		Outpatient physician	
	2003	2013	2003	2013
Prague	1 161 851	1 244 762	5 736	7 385
Středočeský	1 131 402	1 297 209	2 440	2 823
Jihočeský	624 958	636 443	1 597	1 877
Plzeňský	549 307	572 882	1 709	1 877
Karlovarský	304 078	300 999	717	834
Ústecký	819 851	825 842	1 930	2 039
Liberecký	427 096	438 473	993	1 156
Královéhradecký	547 720	552 053	1 573	1 841
Pardubický	506 389	515 781	1 262	1 374
Vysočina	517 572	510 522	1 154	1 267
Jihomoravský	1 121 669	1 168 577	3 400	4 075
Olomoucký	636 227	636 659	1 807	2 070
Zlínský	592 300	586 594	1 425	1 640
Moravskoslezský	1 261 229	1 223 923	3 165	3 499
Czech Republic	10 201 649	10 512 732	30 911	35 770

As a need of care was simply used the population size, which was also obtained from the Institute of Health Information and Statistics of the Czech Republic. Than we calculated the number of outpatient physician per 10 000 patients was calculated for each region of the Czech Republic. For the measurement of inequality, we used four measures of inequality: the absolute and the relative range, these are simple indicators based on extreme values. Further we used the Robin Hood index, which measures the proportion of physicians which must be moved from above-average areas to below average areas to achieve an equitable distribution and Gini coefficient.

The Gini coefficient is one of the most commonly used indicators of inequality and it is derived from the Lorenz Curve. It ranges from 0, in the case of perfect equality, to 1, in the case of perfect inequality. The Gini coefficient is common used in the comparison of inequalities in the distribution of income and welfare, but they were repeatedly used in the comparisons of inequalities in access to health care [5, 10, and 13]. All the date and the calculations were processed using the Microsoft EXCEL for Windows without any other software.

The absolute range is a simple descriptive statistic based on the maximum values, the relative range is a similar statistic, and the only difference is that it is calculated as a percent relative range refers to the average value in the set.

### 3 Regional Distribution - analysis

We first calculated the number of outpatient physician per 10 000 for each territory than the development in the relative numbers of outpatient physicians between years 2003 and 2013 can be shown (see Table 2.) The relative change for the period the year 2003 to year 2013 was calculated. The inequality of regional distribution in 2003 and 2013 can be seen in the Table 3. no region was excluded from the analysis.

As expected, the capital Prague holds an exceptional position with the far highest supply of outpatient physicians per 10 000 if compared with those for the rest of the country. As concerns the capital we can observe that the values show increase in supply of services per capita of 20, 2 %. The region with the highest number of the outpatient physicians per 10 000 both for year 2003 and 2013 is simultaneously a region with the highest increase in number of the outpatient physicians per capita. This situation is common when we try to compare results of our analysis with author of analysis made abroad, e.g. Wilkinson [26].

On average there were 30, 3 outpatient physicians per 10 000 in 2003 and 34, 3 outpatient physicians per 10 000 in 2013, which is an increase by 13, 2 % per 10 years. The lowest value of the outpatient physicians per 10 000 is in the Středočeský region, which has nearly no increase in the number of the outpatient physicians per 10 000 per 10 years. The same trend we can observe at the second undersupplied region Ústecký, only 23, 54 outpatient physicians per 10 000 with 4, 6 % increase in % from 2003 to 2013 is observed. On the other hand, the capital city with its exceptional position and the number of outpatient physicians per 10 000 highly above the state average has the highest increase in %. This trend shows on the increasing of the inequality distribution which we further examine with the inequality measures. Furthermore, from the table we derive the regions which we suggest for the analysis of their policies: Středočeský, Ústecký and Vysočina region, because these regions are relatively under supplied with full time general practitioners as the number of people sharing a general practitioner.

**Table 2: Regional Distribution of Outpatient Physicians (Source: Author)**

Region	Population		Physicians per 10 000		
	2003	2013	2003	2013	Change in %
Prague	1 161 851	1 244 762	49.37	59.33	20.2
Středočeský	1 131 402	1 297 209	21.57	21.76	0.9
Jihočeský	624 958	636 443	25.55	29.49	15.4
Plzeňský	549 307	572 882	31.11	32.76	5.3
Karlovarský	304 078	300 999	23.58	27.71	17.5
Ústecký	819 851	825 842	23.54	24.69	4.9
Liberecký	427 096	438 473	23.25	26.36	13.4
Královéhradecký	547 720	552 053	28.72	33.35	16.1
Pardubický	506 389	515 781	24.92	26.64	6.9
Vysočina	517 572	510 522	22.30	24.82	11.3
Jihomoravský	1 121 669	1 168 577	30.31	34.87	15.0
Olomoucký	636 227	636 659	28.40	32.51	14.5
Zlínský	592 300	586 594	24.06	27.96	16.2
Moravskoslezský	1 261 229	1 223 923	25.09	28.59	13.9
Czech Republic	10 201 649	10 512 732	30.30	34.30	13.2

The absolute values of the outpatient physician were recalculated to the values of outpatient physicians per 10 000, see the table 2. These were used to count the inequality in the geographical distribution of outpatient physician in the Czech Republic in the year 2010 and 2013. The absolute range and relative range are used to count the inequality, moreover, the Robin Hood Index and Gini Coefficient are used, and these consider all the observations. The

absolute range and the relative range, indicate a more unequal distribution in 2013 than in 2003. In the Czech Republic the Robin Hood Index rises by 0, 8 percentage points. The Gini coefficient and Robin Hood index show trend to increasing unequal distribution in 2013.

**Table 3: The Inequality of Regional Distribution in 2003 and 2013**

<b>Inequality Measure</b>	<b>2003</b>	<b>2013</b>
Absolute range	27.8	3,57
Relative Range	0.56	0.63
Robin Hood index (in%)	5.80	6.60
Gini coefficient	0.1102	0.1259

### 3.1 Health policy aimed at inequalities – the central level

The previous empirical evidence also shows that the geographical distribution of the practitioner is highly stable, and it is problematic to evaluate whether these distributions can be changed through normal types of public policy interventions [1]. Despite of this we describe here the activities of the actors concerned.

A special program for the support of under-supplied regions was announced in 2017. The practitioners can apply for subsidies and ask the Department of Health for up to half a million crowns to equip the nursing practice and to use on salaries of the nurses (250 thousand crowns for the equipment and the same amount of money they can apply for the salary of the nurse) in places where this care is lacking. The grant can be claimed by the practitioners in places where the care has not been repeatedly managed (one unsuccessful tender for a practitioner's position). The ministry estimates the amount of 5 five million crowns for 2017. The declaration of the health insurance company to ensure the contract for the contract for potential doctor is a part of the grant application. The role of the Czech health companies is very important, because the system is based on the capitation payments.

### 3.2 Health policy of the undersupplied regions – analysis

The regions also have their role in ensuring the outpatient health care. Negotiation between the region's governor and representatives of the health insurance companies can be held to find a new way how to increase the supply in the disadvantages regions. The regions also announce and organize tenders prior to the conclusion of a contract with a health insurance and have power to find the legal entity dealing with health care.

This part of the paper deals with strategic documents created at regional level in the context of their relevance to the improving access to health care of three undersupplied regions (Vysočina, Středočeský and Ústecký). We concentrate precisely on the part of these documents that focus on the disadvantage of under-supplied regions. Our partial aim was to find evidence, if the regions are aware of their disadvantage and want to perform any activities to strength the supply of the outpatient physicians.

#### *Health policy of the region Vysočina*

The conceptual materials of the region Vysočina is available in an archive of the documents. The region tries to implement national strategy, which is derived from the program "Health 21". One of the aims of the strategy is "better access to family- and community-oriented primary health care" but in the concept we did not find a mention that the government of the region try to improve the access to health care.

#### *Health policy of the region Středočeský*

The situation in the field of conceptual activities of the regions is much diversified. While some regions (such as the Central Bohemian Region) have a comprehensive health care concept

some region forms only a marginal health policy concept within their development strategy. The conceptional activities of the Středočeský region do not give us the possibility to examine the attitude of the region's government to the situation in the region.

#### *Health policy of the region Ústecký*

The Ústecký region has a quite comprehensive health care concept, where the below average number of the outpatient physicians is mentioned. The text describes the development of outpatient health care as a worst supplied region. The number of outpatient specialist is highly below the average of the Czech Republic. As document further describes, the situation is worst in the fields of intern, diabetology, orthopedics, ocular, radiation, clinical oncology and medical genetics. According to the text of the concept, the leader region to cause inequalities is the district "Ústí nad Labem".

Further the concept reacts on the region disadvantage and emphasizes the support of priorities and activities to strength the outpatient physician capacity. The activities are not further described.

From our analysis of the conceptional activities in health policy of the regions government we can derive, that only one from three selected regions realize its disadvantage and perform activities in the field of health policy to improve its situation.

## **4 Conclusion**

The results of our analysis showed that the outpatient practitioners are inequitably distributed in the Czech Republic. Moreover, and what is more important is that there was an increasing trend in the inequality of distribution of outpatient physician between 2003 and 2013. This becomes apparent when all the relative inequality indices are examined. The limitation of our study is that we did not observe differences occurred within in individual districts. The Capital city has most favorable condition. Even if we compare results for the Czech with the results of other states, our results are similar with the results of research from which academic literature describes [e.g. 4].

Policy makers in all levels--national, regional and local--should pay attention as to how human resources are, we examined if they do. Our analysis of the documents at the central level showed that there is evidence that the Ministry aim at decreasing of inequalities between the regions with a subsidy support of undersupplied regions. The doctors can apply the subsidy in the places where the care is lacking. The insurance company declares the contract for potential doctors, who fulfill the conditions.

Through the analysis of the strategic documents; we have found evidence that one of the undersupplied regions (Ústí nad Labem) do realize its disadvantage and aims at the increasing the number of the outpatient physician and therefore improving the access to health care in the region. When we studied the concept of other two undersupplied regions (Vysočina and Středočeský), we did not find evidence that the governments of these regions aim at the improvement of the access of health care for its citizen.

Further research should aim at the topic how much of the differential health status can be ascribed to differences in geographical access to health services or at the topic whether public policy interventions can achieve a more equal distribution of the health care.

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# Party Patronage in Local-government Companies in Slovakia

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## Abstract

Within the transformation of public services provision, various new organizational approaches were applied in Slovakia, among others a corporatization of public services provision. The examples of such public service provision are city-owned companies, which can be regarded as a form of hybrid organizations. To Pollitt and Talbot [14] these organizations stand at the crossroads of state, market and civil society. A significant part of public resources of the local government in therefore under the control of those forms of organizations and several scholars indicate the risk of party patronage in the selections of the CEOs to those companies. This paper thus focuses on the 139 CEOs of city-owned companies that provide technical services and analyses the risk of party patronage in their selection (based on Peters [12]). It looks at their competence and the way they have been selected. Those two proxies indicate whether in this sector, Slovakia deals with meritocratic approach, functional politicization or party patronage. Although the research on motivation to select has not been conducted here, the findings do not indicate significant party patronage in selecting CEOs to city-owned companies to their positions. The data rather indicate functional politicization of the companies and meritocratic approach to be applied.

*Keywords: hybrid organizations; city-owned companies; CEOs; politicization*

JEL Classification: H70

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## 1 Introduction

In the quest of improving the quality of public services, the New Public Management (NPM) brings a set of prescriptions including corporatization of public services provision. The given structural change has been introduced in many countries, including Slovakia, and increased number of hybrid organizations is active in public services provision.

Hybrid organizations operate on the border between the market and the public structures. On one side these companies are established by a public entity, they manage a significant part of the public property and are considered by the public to belong to the public realm. On the other side, they are legally regulated by the Commerce Code. This hybridity - the combination of contradictory features within one single unity - is thus connected with special challenges related to its personnel policy and its politicization. To better understand personnel policy of the hybrid organizations in Slovakia this article looks at 139 city-owned companies. It is structured as follows. The following chapter is devoted to the state of the art in the theory related to hybrid organizations and the challenges connected with their operation. It is followed by the overview of the context of city-owned companies in Slovakia. The third part describes particular research methods. Then the paper provides findings and discussion.

## 2 Hybrid Organizations and Public Companies

Almost 40 years ago, based on the public choice theory [5], many governments started to discuss the improvement of the public service provision through introduction of more competition. According to Moore [11], formation of hybrid organizations was also supposed to improve quality of public sector management and it was understood as an effort to imitate the structure and efficiency of the private sector, whereas public interest objectives remain ensured through public ownership [15]. To Pollitt and Talbot [14] these organizations stand at the crossroads of state, market and civil society. They are usually either former state agencies or organizations that originally emerged from civil society and were later incorporated into the

public sector. Kickert [8] also defines hybrid organizations as those that can be found in the range between commercial firms and government agencies. One hybrid organization can differ from another in terms of ownership, financing and organizational structure. Public companies, which are financially independent firms owned by the state, but legally separated entities [21], also belong to the group of hybrid organizations. Public companies can have many forms and can be owned by different types of public entities. To Sausier and Klien [17] one type of public companies are also companies, which are owned by municipalities, so called city-owned companies. These are commercial companies that are established by municipalities.

As for the governing bodies, in addition to classical dichotomy of the roles and positions defined for public sector – bureaucrats and politicians [12], Moore [11] stresses the role of the public managers in creating a public value when managing refuse collection or manage the parks. The managers in public sector are also found very important in creating public value by Barber [1]. Within the corporate governance system of the private companies the managers also belong to key decision-makers.

In addition to the definition of hybrid organizations, organizational theory also discusses the challenges related to its operation that results from the mixture of different values and different mechanisms of governance, mixtures of coordination mechanisms, rationalities, cultures or action logics [2]. One of the conflicting characteristics within the hybrid organization is the applied model of governance, accountability measures and the level of appropriate political control. Personnel policy and selection of CEOs is relevant in this regard as the decisions of CEOs which shape what and how hybrid organizations do, including the level of political control exercised in those types of organizations. Here some scholars argue for more political control, as according to Stevens [20] and Gradus [6], by giving competencies to organizations and by allowing them to enter market they develop their own identity and cause opportunistic behaviour. They will become focused on themselves and they will not be able to adequately react on impulses from surrounding [20]. Therefore, they can become less dependent for political actors. Government has less say on how the organizations provide services and how they spend public money. The other group of scholars discusses the risk of politicization in selecting top management of the organizations, especially regarding political patronage resulting in low competence of the company leadership. Kopecky, Mair and Spirova [9] claim in this regard that party patronage is rather widespread in post-communist countries due to institutional and cultural legacies of the communist regimes. Following table provides the overview of the motivations and objectives of the political parties within the personnel policy in the public sector.

**Table 1: Party goals and nature of patronage (Source: [7])**

<b>Party goals</b>	<b>Rationale for patronage</b>	<b>Depth of patronage</b>	<b>Criteria for selection clients</b>
Vote	Reward	High	Partisan and personal loyalty
Office	Reward	Low	Partisan and personal loyalty
Policy	Policy control	Low	Professional, as well as political and personal

Within the given context Kopecky et al. [9] defines two main motivations of the politicians to politicize and distinguish between the motivation to control the organization and motivation to reward loyal members of political parties, supporters of political parties and even to reward friends and family members. The motivation to control the organization may be explained by principal-agent theory - political nominations may decrease problems related to interests of principals to control agents – bureaucrats [4] and then strengthening of vertical accountability. Decisions of the politicians to nominate to the senior position therefore does not necessarily implies nomination of the party members and related party patronage. It also does not necessarily mean nomination of party members without required competence. Political

nomination can be conducted with the aim to improve compatibility of the bureaucrats and politicians vis a vis particular policy. Therefore, when discussing politicization, it is possible to patronage politicization and functional politicization.

Based on the above, it is possible to distinguish between meritocratic approach and politicization. For meritocratic one it is typical that people are selected on the basis of their qualifications and through predefined selection process. According to Peters [13] the main aim of meritocratic system is to employ the best experts available. This selection is also called the selection on the basis of neutral competence. The second approach to selection is politicization. When the main motivation for particular selection is the reward people loyal to political party [7]. The third approach is so called functional politicization. It stands for the situation when political bureaucrats, according to Peters [12], are not necessarily without qualifications and required training. If bureaucrats are selected on the basis of political nominations but they also possess required qualification and skills they have so called responsive competence that leads to functional politicization. Peters [12] also points out that such way of selecting to the positions may be more beneficial than selecting on the basis of neutral competence due to the fact that in situations in which it is necessary to assert the ideas of politicians it is more helpful if the top management is identified with the opinions of the politicians and at the same time has expertise in the given field. Kopecky et al. [9] indicate that in EU countries that have been explored in their research, the value of professionalism is relatively high (see Table 2). That would rather imply for functional politicization to take place in the selection for positions in hybrid organizations.

**Table 2. Motivations for political decisions to public positions, European average (Source: [9])**

<b>Motivation behind political selection</b>	<b>% of answers</b>
Professionalism	88,10
Political/party loyalty	68,10
Personal loyalty	50,40
Others	17,30

**3 City-owned Companies in Slovakia**

The year 1990 was a starting point for the reforms of the public sector in Slovakia. Among others, formation of the local municipalities started with the aim to provide more political autonomy and competencies to these entities. One of the given competencies relates to the possibility to use municipal property for business purposes. Slovak municipalities therefore can establish for-profit companies, which are governed by the private law. These companies are also called city-owned companies, on which the paper concentrates. All together Slovakia has 2890 municipalities, 140 of them are recognized as cities. As mentioned above, Slovak cities may create city-owned companies and they can be either wholly owned by the municipality (municipality is 100% owner) or partially owned by municipality (less than 100%).

The city-owned companies in Slovakia provide many types of public services - they organize waste collection and disposal, build and/or administrate road infrastructure, provide water supply and wastewater management, conduct administration and sales/acquisition of real estate, provide transportation, administration of urban forests, as well as health and social services.

Based on Kubikova [10], in 2016 there were 179 local companies in 140 Slovak cities, in which a city owned 100 percent of the assets. These companies mostly operate in the area of technical service provision, administration of real estate, cultural services etc. From the legal point of view (the Slovak Commercial Code), the most widespread organizational form of city-owned company is Limited Liability Company.

There can be several governance bodies in the Limited Liability Companies - main statutory and executive body (hereinafter “CEO”), board of directors and general assembly (in public companies fully owned by local governments is represented by mayor). As for the selection of the CEO in addition to the Commercial Code the Law on Municipalities is also

relevant and based on this Law the selection of the CEO is conducted by the municipal council. The Code does not explicitly require conducting open formalized selection process when selecting CEO and municipality can choose how to select managers of their companies.

Selection of the CEO's selection process is negatively perceived by general population. TI Slovakia and Focus Agency conducted the survey on recruitment process in the city' organizations in 2007. According to this survey, 51 percent of respondents perceive the recruitment process in the municipality as one of the most corrupt decision-making areas [19].

#### 4 Research Questions and Methodology

This paper explores personnel policy of the local governments in Slovakia, more precisely the personnel perspective applied by the local governments (cities) when selecting CEOs of the local companies. We have not conducted qualitative research on motivation of the politicians when selecting to CEO positions in hybrid organizations. We work with the proxies that only indicate selected approach. The main research question is as follows: do local governments prefer meritocratic approach when selecting CEOs to local companies, do they apply patronage or functional politicization? To answer this question two main proxies are used:

- **WHO are CEOs.** Within exploring WHO are the CEOs of city owned companies, we look at the selected characteristics of the previous career path that are relevant in relation to the form of the politicization. Taking into account the limitation of collected data on CEOs, three aspects are crucial for the analysis of their profile:
  - whether CEOs have experiences with managerial position before becoming CEO of the city-owned company
  - whether the given CEO holds or held any political position

These characteristics provide an information on competence (managerial experience) and potential loyalty to a particular party or politician (political experience). More precise variables (i. e. a membership in a political party or business/private relationships with relevant actors in the city, etc.) are not available.

The data are gathered from three main sources. The first are data from CVs of the CEOs. The collection of CVs was through e-mail requests. CVs provide information about education, previous professional experience, gender, and age. For the purpose of this paper, we analyse solely professional and political experience. A political function is any elected office. Fair Play Alliance administers open space database of all elected officials in Slovakia since 1994. Hence, we can investigate each CEO's current or previous political experience in elected office. The analysis focuses on one electoral term 2014-2018, however we also take into account previous CEO's political functions and candidacies at all levels of governance (local, regional, national).

- **HOW CEOs** have been selected. Each CEO has to be formally approved by municipal council and there are two main approaches:
  - decision of the municipal council with prior open formalized selection proceeding
  - decision of the municipal council without a prior formalized selection proceeding.

The data for this analysis has been obtained from city websites (if available) or by applying Freedom of Information Act.

The combination of the given characteristics of the CEOs enables to indicate the type of selection approaches taken by the local governments and the related type of the political control exercised by the local government over the city-owned company as shown in Table 3.

**Table 3: Combination of the competence and selection process vis a vis the type of selection approaches and potential politicization (Source: Authors based on [13] and [18])**

Criterion/Type of politicization	Previous managerial position in public sector	Previous managerial position in private sector	Holding political position	Selected through formalized selection process	Selected without formalized selection process
Meritocratic approach	2	2	2	2	2
Functional politicization	2	2	2	2 / 2	2/2
Political patronage	2	2	2	2	2

The analysis is conducted on the sample of 179 public companies and all together 139 CEOs due to data availability - 40 city companies and/or CEOs did not send requested information (CV), and this information was also not available on the website. The sample (179 city-owned companies) consists of all publicly owned companies in 100 biggest cities in Slovakia. To provide answers for the above-mentioned questions, quantitative analysis is applied, and the methods and instruments of descriptive statistics are used.

## 5 Findings

The paper uses two main proxies to answer research questions - who are CEOs (individual characteristics - managerial experience and political position held in the public sector) and how they have been selected (selection process).

The vast majority of CEOs have previous managerial experience. Approximately, 9 out of 10 CEOs (88,5 percent) in city-owned companies have had previous managerial experience. A slight majority of these CEOs (56,1 percent) have had previous experience from private sphere. An experience from private sphere may be an appropriate experience for CEOs in the city-owned companies. However, we have no sufficient data to state whether public managers with an experience from private sphere perform better than managers without previous experience from private sector. Interestingly, up to 94 percent of CEOs without any management experience (16 CEOs), did not have any previous experience from the private sector.

The second characteristic related to the career paths which is explored in this paper is the previous political experience. One third of CEOs have previous or current political experience as a city councillor (21), or as an elected representative on various levels of government in various electoral terms or at least ran for an elected office (24). Even though these candidates would be considered as potential candidates representing party patronage approach of local governments' selection of CEOs, the data do not prove it. Only one CEO did not have any managerial experience from private or public sector which indicates that almost all CEOs can be perceived as formally competent for the CEO position. The selection proceedings do not make any significant difference in terms of selected CEOs with previous political experience. Approximately half of CEOs who in the period of selection of CEOs to city-owned companies held a political mandate in city council, were selected via open formalized selection proceedings. About 63 percent of CEOs with an experience with other political mandate or candidacy were selected without open formalized process.

For the purpose of this paper, two formal approaches of selection of CEOs are analysed - selection with prior open formalized selection proceeding and selection without prior open formalized selection proceeding. Both approaches result into a comparable preference for the CEOs with previous managerial experience, as approximately 9 out of 10 selected CEOs have previously worked as managers in public or private sphere. In other words, we do not observe that open formalized selection proceedings lead to higher share of CEOs with managerial experience. Moreover, there is no significant difference between these two approaches of selection of CEOs in relation to the previous experience from private sphere. Although, the data

indicate that the selections without open formalized proceeding have resulted to slightly higher ratio of CEOs with previous managerial position in private sector (2 p.p.).

**Table 4: Types of politicization in city-owned companies in Slovakia (Source: Authors based on [13] and [18])**

Criterion/Type of politicization	Previous managerial position in public sector	Previous managerial position in private sector	Holding political position	Selected through formalized selection process	Selected without formalized selection process	City-owned companies
Meritocratic approach	2	2	2	2	2	38 (27,3 %)
Functional politicization	2	2	2	2 / 2	2/2	44 (31,7 %),
Political patronage	2	2	2	2	2	0 (0 %)
Other <sup>1</sup>	2 / 2	2 / 2	2	2	2	57 (41,0 %)

<sup>1</sup>Note: There is in total 57 CEOs who do not fall into three types of politicization. Majority of these CEOs are CEOs with managerial experience and selected without prior open formalized process.

As described in methodological part of this paper, we distinguish three types of politicization in city-owned companies. When competent CEOs (in terms of previous managerial experience) without a previous experience from any political position is selected via open formalized process, it can be defined as meritocratic approach. Those CEOs who hold political position in municipal council or have had any other political experience but at the same time have previous managerial experience, represent functional politicization. Last but not least, political patronage is the approach when an elected official is selected for CEO positions without open formalized selection process. Data on 139 CEOs indicate that there is no party patronage in city-owned companies, but rather functional politicization (31,7 %). The functional politicization is prevailing approach, however, the occurrence of a meritocratic approach (27,3 %) is not significantly less common than functional politicization approach.

## 6 Conclusion: What Approach in Selection Policy Prevails?

This paper looked at the personnel policy of the local governments in Slovakia and more precisely at the personnel selection approach applied by the local governments when selecting CEOs of the local companies. Based on the previous work career and the applied selection process [12] by the local governments, the data indicate that the most prevailing approach to the selection of CEOs is the functional politicization over the meritocratic approach, although the difference is not very significant (4,4 p.p.) In this case, it indicates that mostly political managers manage local companies.

As the Table 4 shows, many of the CEOs fall into the category of “others” - selected for managerial position (with or without previous managerial position) with no evident political connections but selected without the prior formalized selection process. That can be the case because, as mentioned in methodology, the data on the membership in political parties in Slovakia are not available and there is also no database of people affiliated to political parties. Therefore, our findings related to political affiliation are limited and we expect that in case this data would be available more of the CEOs would be defined as political managers. The second reason might be not political but personal patronage to be applied here - appointing friends and/or family members to those positions.

Based on the selected proxies we can conclude that the party patronage has not been proved to be the main organizing principle when selecting CEOs in the public companies functioning on local level. The public perception measured by Transparency International Slovakia in 2007 (51 % of respondents perceive the recruitment process in the municipality as one of the most corrupt decision-making areas) is more critical [19]. Here two explanations can

be provided. First, the survey done by Transparency International Slovakia did not disaggregate between the CEO and boards members in the local public companies. Hence, research on selection of the boards members would be needed to identify the possible differences in the applied approaches. The second possible explanation is that the majority of our sample are local services operated in the area of providing technical services. The outcomes of these kinds of services are measurable [3] and therefore politically sensitive - e. g. the parks to be cut and roads be cleaned in time. That creates the demand for good management skills. Sheer proximity of voters and tangibility of the managerial results may make politicians to prefer meritocratic approach and functional politicization to party patronage. That argument would stand for the need to really allow the professionals with political links to manage the local public services and party patronage not to prevail here. To better explore this issue and understand hybrid organizations like city-companies, further research is needed.

The paper also indicates that some local governments even might have applied meritocratic approach. Here following explanation can be provided - as there has been intense NGOs and media pressure to decrease politicization on local level at least formal selection processes have been introduced. To further explore this argument, we need to conduct in-depth analysis of the selection processes, the approach which has been applied by Italian researchers Sancino, Grossi, and Sicilia [16] as well as qualitative research on motivations [9].

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# Comparing the Performance of the University Patenting in Czech Republic

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## Abstract

Universities contribute to economic growth not only through teaching and research, but particularly through the transfer of developed technology. The number of university patents in the US has increased radically since the 1980s, in part due to the Bayh-Dole Act. Inspired by this example, several European countries introduced Bayh-Dole-like legislations to facilitate patenting and licensing for universities in subsequent years. Czech universities are increasingly protecting their inventions especially since 2005 because of new methodology of evaluation of the results of research organizations and results of finished programs approved by Office of the Government of the Czech Republic. One way of measuring the economic effects of these increased patent activities is to examine patent data. This study examined patents originating from 19 Czech universities and considered metrics such as the number of patents published, technology specializations and the frequency of PCT patent application filing. From this data we should be able to extend our understanding of the relationship between patents and the impact of university originated research.

*Keywords: patent; IPC; university patenting*

JEL Classification:

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## 1 Introduction

Patent data provide a primary data source for scholars interested in the development of technological knowledge [2]. Patents and patent citations provide “a window on the knowledge economy.” [3] However, patents are indicators of inventions and not innovations [4]. Like publication data, patent data provide a wealth of information about references to prior art, forward citation, inventor and applicant addresses, and classifications [1]. This document describes a base structure to perform preliminary analyses aiming at better understanding the characteristics of patent portfolio of Czech universities, in direct comparison with other information. The analysis has been carried out by elaborating the patent information contained in the database of Industrial Patent Office of Czech Republic (UPV). Patent documents have classification symbols to facilitate finding and extracting relevant information from them. Although several classification systems exist, today the International Patent Classification (IPC), which was established by an intergovernmental agreement concluded more than 30 years ago and administered by World Intellectual Property Organization (WIPO), is the most widely applied by all the major industrial property offices. Patent classification schema organize patents into groups of similar technologies. In a granted patent, the examiner-assigned classification codes can be used to search for patents in the same or related technology areas. A classification search is a more focused way of searching for patents in a given field than is fishing with keywords. **The classification system can be considered as the intellectual organization of the database of novel products and processes of economic value** [1]. It can be used co-classifications of patents for characterizing the technological positions of firms with the objective of quantifying technological opportunities and research spillovers [5]. Universities are an important part of a country's national innovation system, which is the institutional landscape shaping the innovativeness of a country [8]. Recent years have seen an increased use of patent metrics to evaluate innovation and research performance. [9]. Some empirical studies have largely focused on analyzing university patenting in individual countries and regions. For example exist analys from an international perspective, examining patents at the top 300

universities worldwide. By providing a patent ranking system and an analysis of the determinants of university patenting, we enable an international comparison not only between different countries but also between universities within countries [10]. Also is available study of examined patents originating from 12 Australian universities and considered metrics such as the number of patents published, technology specializations and the frequency of citations of patents in other literature. From this data we were able to extend our understanding of the relationship between patents and the impact of university originated research [11]. Another studies evaluates commercial potential of university patenting through participation of PCT application [12, 13]. The increasing of academic patenting in Czech Republic the last decade has spawned an accompanying upsurge in scholarly analysis about reasonability of this increased activity, especially If we take into the consideration that growing commercial engagement has not, thus far, altered the research culture of universities so as to privilege basic science applied orientations at the expense of basic science. This study utilized the mining, analysis and interpretation of patent information included in patent documents published in patent database of Czech industrial property office that originated from research conducted by 19 Czech universities. The aim of the study is to classify Czech universities into groups according to similarity on the basis of selected variables

## **2 Material and Methods**

This study adopts different information for determining the patent activity of Czech universities. In our study, we are studying the university as a unit in terms of patent activity. Within each such institution, activity is uniformly monitored, with most of them set up a unified system of intellectual property protection through a technology transfer office, regardless of the faculty structure of each university. Last but not least, it is necessary take into the consideration that the patent activity is monitored and registered at the National Industrial Property Office of the Czech Republic in the sense of reporting each university. An important factor is the fact that some scientists, especially at regional universities, change positions in different faculties of the same university or work for a university in interdisciplinary subjects. However, it is precisely those scientists who carry new ideas, generating significant inventive thoughts. We have to mention the fact that in the last decade have been made in in many universities changes in the internal structure and division of the institutes, departments, faculties and new transfer technology offices has been established.

### *2.1 IPC Patent Classification*

The shares of IPC codes (on the selected level of aggregation) suggest the main fields of activity with reference to the patent portfolio [7]. The classification system contains about 70 000 entries, i.e. classification symbols or codes that can be allotted to patent documents. Symbols are arranged in a hierarchical, tree-like structure: at the highest level are the eight sections corresponding to basic technical fields: (A: Human Necessities; B: Performing Operations, Transporting; C: Chemistry, Metallurgy; D: Textiles, Paper; E: Fixed Constructions; F: Mechanical Engineering, Lighting, Heating, Weapons; G: Physics; H: Electricity). Also exist technology classification into a 32 technology fields based on IPC classes: (Agriculture; Foodstuffs and Tobacco; Personal and Domestic Articles; Digital communication; Basic communication processes; IT methods for management; Shaping Metal; Material Processing; Printing; Transporting, storing; Microstructural technology, nanotechnology; Inorganic Chemistry; Organic Chemistry; Macromolecular Compounds; Dyes, Animal and Vegetal Oils; Biochemistry, Sugar, Leather; Metallurgy; Textil and Flexible Materials; Paper; Building; Drilling and Mining; Engines and Pumps; Engineering in General; Lighting and Heating; Weapons and Blasting; Measuring, Optics, Photography; Horology, Regulating, Computing; Musical Instruments, Storage; Nuclear Engineering; Electricity; Electronic Circuits, Communication Technology; Other subject matter not).

## 2.2 Cluster analysis

Cluster analysis is a common technique for statistical data analysis, used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, bioinformatics, data compression, and computer graphics. Our cluster analysis or clustering is the task of grouping of patent activity of each university in IPC sections in such a way that universities in the same group (cluster) are technological more similar (in some sense) to each other than to those in other clusters.

## 2.3 Time trends

Combining the analysis with time trends might provide insights on innovative trajectories. It is worth reminding that usually patent databases suffer from significant lags between the application date and the publication date [7]. In this study has been calculated average number of developed invention per year.

## 2.4 Geographical scope

Performing a crossed analysis with geographical scope helps in pointing out particular sector-countries specificities [7]. The globalization of R&D inclines to international patenting for example by filing Patent Cooperation Treaty (PCT) application. A PCT application does not result in a patent. It provides you with an option to file national or regional applications for patents and utility models in the designated countries in the PCT application or at the European Patent Office.

## 2.5 Other relevant information

The patent activity can be influenced by other factors as quality and size of university or quality and experiences of university researchers, relationship with private sector.

## 3 Results and Discussion

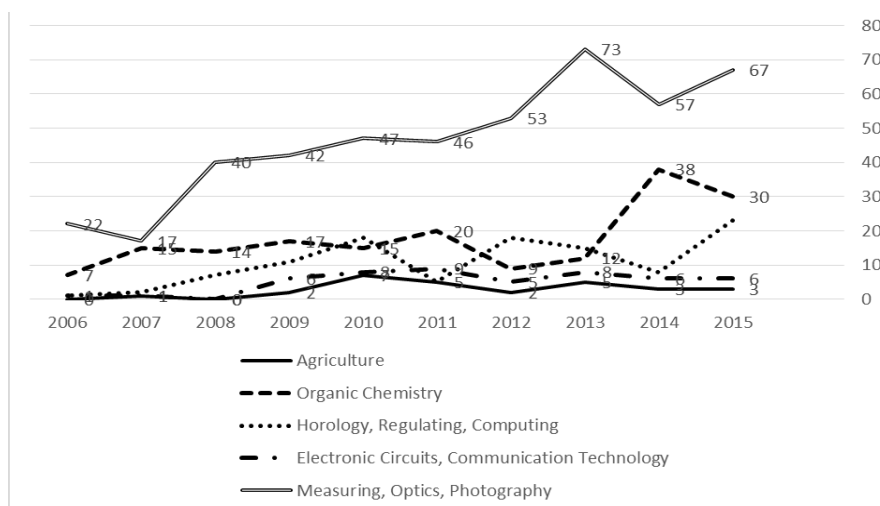
### 3.1 Technology orientations of Czech universities

In figure 1 can be seen patent activity of all Czech university in different technology fields. . The largest activity since 2006 till 2005 in patent application filing can be observed in Measuring, Optics, Photography (488 cases) and Organic Chemistry (188 cases). In figure 2 can be seen patent activity in time

Figure 1. Patent activity 2005-2016 of Czech universities regarding to technology fields

	Agriculture	Foodstuffs and Tobacco	Personal and Domestic Articles	Digital communication	Basic communication processes	IT methods for management	Shaping Metal	Material Processing	Printing	Transporting, storing	Microstructural technology, nanotechnology	Inorganic Chemistry	Organic Chemistry	Macromolecular Compounds	Dyes, Animal and Vegetal Oils	Biochemistry, Sugar, Leather	Metallurgy	Textil and Flexible Materials	Paper	Building	Drilling and Mining	Engines and Pumps	Engineering in General	Lighting and Heating	Weapons and Blasting	Measuring, Optics, Photography	Horology, Regulating, Computing	Musical Instruments, Storage	Nuclear Engineering	Electricity	Electronic Circuits, Communication Technology	Subject matter not
2016	2	2	2	13	8	12	10	11	1	8	10	15	11	8	2	7	9	2	2	7	0	4	6	5	2	24	9	0	4	10	3	0
2015	3	5	3	25	16	22	20	32	2	18	25	20	30	18	12	17	9	11	6	19	0	12	12	13	0	67	23	5	3	18	6	0
2014	3	5	1	15	29	20	22	25	2	20	15	25	38	22	18	22	25	11	4	15	2	6	10	13	4	57	8	2	2	19	6	0
2013	5	3	2	24	19	18	17	27	5	30	29	21	12	22	12	12	16	14	4	29	0	12	12	13	2	73	15	10	3	14	8	1
2012	2	1	2	18	16	15	18	36	4	8	16	24	9	12	14	17	11	12	5	13	2	8	10	9	2	53	18	2	4	10	5	0
2011	5	5	2	14	10	19	21	29	4	9	22	16	20	12	14	17	11	13	6	9	4	11	10	6	3	46	5	2	3	10	9	0
2010	7	8	2	19	10	19	19	27	2	18	17	26	15	8	13	14	13	5	8	10	3	14	18	7	1	47	18	3	1	11	8	1
2009	2	3	0	8	14	6	7	11	1	11	12	16	17	5	9	11	6	4	2	4	0	10	7	4	0	42	11	2	3	13	6	2
2008	0	3	1	9	9	9	8	7	1	4	3	6	14	5	9	11	2	3	2	5	2	7	3	4	2	40	7	4	0	14	0	0
2007	1	0	0	4	8	7	8	5	1	3	7	6	15	1	10	7	4	6	0	3	0	4	5	3	0	17	2	0	1	6	1	0
2006	0	2	2	8	6	8	5	2	0	3	1	7	2	2	6	1	4	1	1	1	2	6	1	0	22	1	1	0	4	1	0	
	30	37	17	157	145	155	155	212	23	132	157	176	188	115	115	141	107	85	40	115	14	90	99	78	16	488	117	31	24	129	53	4

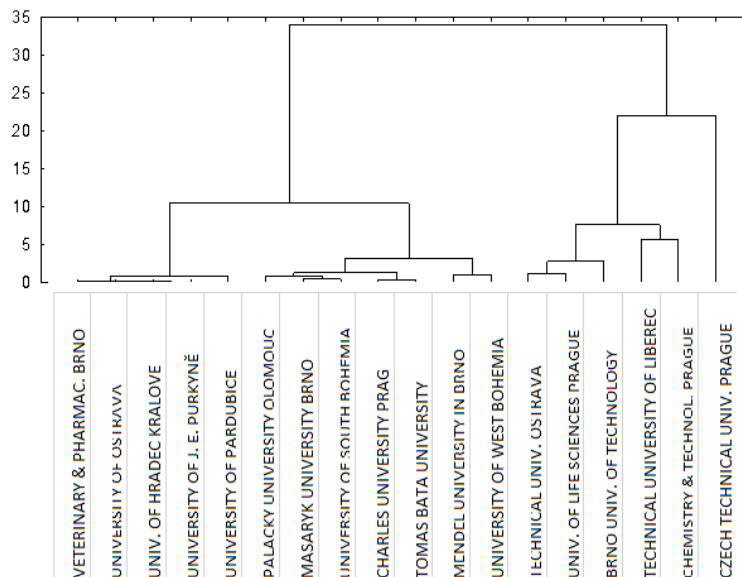
**Figure 3. Distribution of patent activity 2005-2016 for some technology fields**



In figure 3 can be seen that largest increasing of patent activity is in Measuring, Optics, and Photography. Since 2006 till 2015 annual patent activity has been increased in this technology field about 300%.

In figure 4 can be seen cluster analysis of patent activity of each university according to IPC section. In figure 4 can be seen 3 main clusters. The largest patent activity can be observed by technically oriented universities. The main technology area of Czech universities is IPC section C (Chemistry, Metallurgy) followed by IPC section G (Physics).

**Figure 4. Distribution of Czech universities regarding to cluster analysis, ward method**



### 3.2 Time trends

In table 2 can be seen total patent activity of each university and year of first patent application filing. The biggest universities are able to develop circa 40 inventions per year, average is 13,5 inventions per year.

**Table 2. Distribution of total patent activity of Czech universities and year of first filing**

Name of the University	Nf of patent cases	Year of first patent application filling	Nr. of patent cases per year
CZECH TECHNICAL UNIV. PRAGUE	1521	1978	40,0
CHEMISTRY & TECHNOL. PRAGUE	1040	1978	27,4
BRNO UNIV. OF TECHNOLOGY	627	1980	17,4
TECHNICAL UNIVERSITY OF LIBEREC	522	1996	26,1
UNIV. OF LIFE SCIENCES PRAGUE	514	2003	39,5
TECHNICAL UNIV. OSTRAVA	458	1995	21,8
UNIVERSITY OF WEST BOHEMIA	294	1981	8,4
MENDEL UNIVERSITY IN BRNO	258	1989	9,6
TOMAS BATA UNIVERSITY	206	2001	13,7
CHARLES UNIVERSITY PRAG	192	1982	5,6
UNIVERSITY OF SOUTH BOHEMIA	157	2003	12,1
MASARYK UNIVERSITY BRNO	137	1987	4,7
PALACKY UNIVERSITY OLOMOUC	130	1984	4,1
UNIVERSITY OF PARDUBICE	86	1986	2,9
UNIVERSITY OF J. E. PURKYNĚ	26	2005	2,4
VETERINARY & PHARMAC. BRNO	21	2010	3,5
UNIV. OF HRADEC KRALOVE	16	2011	3,2
UNIVERSITY OF OSTRAVA	8	2009	1,1
average	345,2	1993,2	13,5

### 3.3 Other relevant information

In table 3 can be seen number licenses registered by UPV. The most success university licensing is signing contract circa in 11% patent cases. In average Czech universities is licensing only 3% of their inventions. In table 3 can be also seen number of patent applications per one employee. The most success university has ration 1,7 invention on one employee. In average can be count 0,4 inventions on one employee. It hasn't been taken into the consideration the fluctuation of employee, length of working contact, number of employee in time. So this statistical information is very rough.

**Table 3. Comparing the Performance of the University Patenting in Czech Republic**

Name of University	Nr of licences	Nr of licences in %	Nr. of employee	Nr of inventions per 1 employee	Nr. of PCT patent application	Nr. of PCT patent application in %
CZECH TECHNICAL UNIV. PRAGUE	19	1%	1918	0,8	34	2%
CHEMISTRY & TECHNOL. PRAGUE	9	1%	630	1,7	8	1%
BRNO UNIV. OF TECHNOLOGY	12	2%	1338	0,5	21	3%
TECHNICAL UNIVERSITY OF LIBEREC	13	2%	543	1,0	24	5%
UNIV. OF LIFE SCIENCES PRAGUE	6	1%	723	0,7	2	0%
TECHNICAL UNIV. OSTRAVA	38	8%	1171	0,4	7	2%
UNIVERSITY OF WEST BOHEMIA	8	3%	923	0,3	0	0%
MENDEL UNIVERSITY IN BRNO	6	2%	707	0,4	1	0%
TOMAS BATA UNIVERSITY	12	6%	469	0,4	20	10%
CHARLES UNIVERSITY PRAG	7	4%	4653	0,0	23	12%
UNIVERSITY OF SOUTH BOHEMIA	10	6%	633	0,2	4	3%
MASARYK UNIVERSITY BRNO	15	11%	1744	0,1	13	9%
PALACKY UNIVERSITY OLOMOUC	7	5%	1671	0,1	33	25%
UNIVERSITY OF PARDUBICE	1	1%	635	0,1	3	3%
UNIVERSITY OF J. E. PURKYNĚ	0	0%	277	0,1	3	12%
VETERINARY & PHARMAC. BRNO	0	0%	462	0,0	2	10%
UNIV. OF HRADEC KRALOVE	0	0%	354	0,0	1	6%
UNIVERSITY OF OSTRAVA	0	0%	469	0,0	0	0%
average	9,1	3%	1073,3	0,4	11,1	6%

### 3.4 Geographical scope

In table 3 can be seen PCT patent activity with comparison with total patent activity. The most active university in PCT is filing circa 25% from all patent portfolio. In average Czech universities is protecting their inventions by PCT patent application only in range 6%.

## 4 Conclusion

Making universities and other public research organizations more active in protecting and exploiting their IP means not only actively promoting faculty and student research but also set up reasonable trends for this type of research. The results above show the fact: Czech universities are too focused on the area Measuring, Optics, and Photography. I am not sure if the this is profitable area for commercialization of research, but in this area increases university patenting in the Czech Republic about 300%. PCT patent application participation in patent portfolio in range 6% is low. If owner of patent application is not able to produce final product, should be filed only patent application with international scope of protection. It is very costly for an institute to go and file for patents at first and later on try to find investor/buyer of technology. The way how to increase the commercial potential and overcome gap between research and production is closer cooperation with private sector from the beginning. In the next study should be find out ways how can be university patenting more effectively.

## Acknowledgements

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# The importance of tax incentives in supporting R&D activities in OECD countries

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## Abstract

*Goal* – To demonstrate the essence of tax incentives for R&D and examine their real importance in supporting R&D activities in OECD countries. *Research methods* – The research objective was to be achieved by verifying the hypothesis: In the years 2000-2015 there was a significant increase in the importance of tax incentives in supporting R&D activities in OECD countries. Two variables representing the importance of tax incentives have been distinguished: popularity and use. Only the increase of both variables over the period considered could allow a positive verification of the hypothesis. *Results/findings* – An increase in the value of both variables was observed during the period considered which confirms the previously mentioned hypothesis. In addition, it was also found that the rise in the importance of tax incentives in the OECD in the period 2000-2015 was mainly based on the growing popularity of this instrument. The increased use of tax incentives has also increased the importance of this instrument, but to a much lesser extent. *Conclusion* – Successive research works should focus on explaining the reasons for the intense increase in the popularity of tax incentives in the 21st century and factors influencing the difference between the dynamics of popularity of tax incentives and their use in the countries that have these instruments.

*Keywords:* R&D activities; fiscal policy; tax incentives; direct funding

JEL Classification: H25, O38

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## 1 Introduction

The positive impact of technological changes and R&D activities on economic growth and development seems undeniable in the light of modern research. Romer [23], Grossman and Helpman [13] as well as Aghion and Howitt [1] indicated that these two factors are strong determinants of long-term economic growth. At the same time, the R&D activities are characterized by market mechanism failures, such as high asymmetry of information between recipients and providers of capital, high transaction costs and differences between private and social rates of return. These factors contribute significantly to an increase in risk and reduced access to capital, which results in the underinvestment of R&D activities under market conditions [26]. Therefore, State intervention appears desirable in R&D activity.

Recent studies generally show that government funding has a positive impact on R&D's private activity which varies, however, depending on the type and number of support instruments offered [3, 4, 6, 7, 14, 15], size of enterprises and amount of support [12, 17], the length and stability of support [16]. Endogenous growth models also indicate the positive long-term impact of government R&D incentives on economic growth, but make the existence of positive effects and their scale dependent on the amount of support [25] and the type of instruments used [18].

The type of instruments used is often indicated as a determinant of the effectiveness of fiscal policy in support of R&D activities. An important and frequently mentioned criterion of dividing the tools of public funding of R&D activity of enterprises is the type of expenditures incurred by the state budget. In this case, a distinction should be made between direct (grants and subsidies) and indirect funding (reliefs and other tax incentives).

Only direct funding is recorded on the expenditure side of the state budget. However, it should be noted that both types of instruments involve a budgetary burden. Indirect funding is possible thanks to the use of preferential tax solutions in relation to entities conducting R&D

activity. Tax incentives imply indirect expenditure of public funds by waiving potential tax revenues. Such a method of spending public funds is referred to in the literature as tax expenditures. There are also significant differences in measurement and control issues between the two types of instruments due to the different ways in which public funds are spent. While in the case of direct funding there are no problems with planning and measuring the amount of public funds allocated for R&D support, in the case of tax expenditures one can only estimate the value of expenditures [8]. It should also be noted that only a few countries include this type of public expenditure in their budget reports.

Another important group of differences between tax and direct funding is their invasiveness to the market-based resource allocation mechanism. Firstly, grants and subsidies are the result of discretionary government decisions which significantly interferes with market competition and causes high transaction costs both on the public and private side. Tax incentives, in turn, can be defined as instrument which are market-oriented and support more efficient (higher profit rate) projects – they are available to a wider group of beneficiaries and leave the decision of using and spending funding to companies [2]. On the other hand, however, the *ex ante* funding used for grants and subsidies allows public support to be concentrated on projects with a high social return. While in the case of tax incentives where *ex-post* funding is provided, there is a high risk of substitution of private funds by public funds. The main differences between direct and tax funding are presented in Table 1.

**Table 1. Differences between direct funding and tax incentives (Source: Author)**

<b>Type of instrument</b>	Direct funding	Tax incentives
<b>Type of burden on the state budget</b>	Budgetary expenditure	Tax expenditures
<b>Measurement and monitoring</b>	Precise amounts	Estimates
<b>Invasiveness to the market mechanism</b>	High	Low
<b>Moment of funding</b>	Ex ante	Ex post

Both literature and OECD reports increasingly highlight the role of supporting R&D activities in conducting effective economic policies. It is also often pointed out that tax incentives are an important tool for achieving this objective. Therefore, in the author's opinion, the question of the actual importance of tax incentives in supporting this activity is an important unresolved scientific problem. In view of this, the main objective of this study is to examine how the real importance of tax incentives in state funding of R&D activities of enterprises in OECD countries has changed since the beginning of the 21st century. A review of the research hypothesis is to be used to achieve the research goal: In the years 2000-2015 there was a significant increase in the importance of tax incentives in supporting R&D activities in OECD countries.

## **2 Material and Methods**

Investigating the actual role of tax incentives in supporting R&D activities in OECD countries (and its evolution) required distinguishing two variables:

- *Popularity of tax incentives* – the number of countries that have tax incentives for R&D within their tax system;
- *Use of tax incentives* – share of tax funding in the total amount of government funds spent by individual countries to support R&D activities of enterprises.

The use of two different variables in the study was necessary because the fact that a given country has R&D incentives under tax legislation does not always mean that this instrument is considered to be an important element of the R&D support policy. In some cases, enterprises may not be interested in using existing incentives. This can be due to the low attractiveness of the benefits offered or the high requirements for potential beneficiaries that discourage the use of incentives. Therefore, there is a need to establish not only the popularity of using tax

incentives but also the level of their actual use in relation to the opposite instruments, i.e. grants and subsidies. The general characteristics of both variables are described in Table 2.

**Table 2. Variables representing the importance of tax incentives in supporting R&D activities (Source: Author)**

Variable	Popularity	Use
<b>Measurement method</b>	Absolute (numeric)	Relative (percentage)
<b>Countries examined</b>	34 OECD countries (without Israel*)	34 OECD countries (without Israel*)
<b>Time period</b>	2000-2015	2000-2015
<b>Data sources</b>	OECD reports and other sources	OECD statistics

\* The manner of spending and recording public funds spent in support of R&D activity of enterprises in Israel does not allow the separation of tax and direct funding.

Only results indicating an increase in the value of both variables over the period analyzed can lead to a positive verification of the research hypothesis. Otherwise, the hypothesis should be denied.

### 2.1 Popularity of tax incentives

The analysis of the number of countries applying preferential tax regulations was aimed at checking whether this way of supporting R&D activities was practiced by a significant part of OECD members or whether it was used selectively. The changes in the variable value over time were analyzed. To this end, appropriate statistics have been established. The source material was information from OECD [19, 20, 21] and EU [10] reports, websites of government administration of individual countries [11], reports of NGOs [27] and literature [5, 9].

### 2.2 Use of tax incentives

The analysis of the level of use of tax incentives and its changes was based on an analysis of the percentage of resources allocated to support R&D activities that constituted tax incentives in individual OECD countries in the years 2000-2015. The statistics contained in OECD reports were used as the source material [20, 22]. In order to illustrate the changes in the variable at the level of the whole organization, an average value of the variable has been calculated for each year, covering respectively all OECD countries (1) and only countries with tax initiatives (2).

$$\overline{TI}_{OECD_t} = \frac{\sum_{n_t=1}^{N_t} TI_{nt}}{N_t} \quad (1) \qquad \overline{TI}_{CWTI_t} = \frac{\sum_{m_t=1}^{M_t} TI_{mt}}{M_t} \quad (2)$$

where:

$\overline{TI}_{OECD_t} / \overline{TI}_{CWTI_t}$  - average use of tax incentives in OECD/countries with Tax Initiatives (CWTIs);

$TI_{n_t} / TI_{m_t}$  - share of tax funding in government expenditure on support for R&D activity.

A linear regression model (3) was also developed to study in depth the reasons for changes in the role of tax incentives in the OECD between 2000 and 2015. The model explains the changes in the average use of tax incentives in the OECD according to two variables: the number of countries with tax incentives and the average use of tax incentives only in countries with this type of support instrument.

$$OECD_t = \alpha_0 + \alpha_1 NOC_t + \alpha_2 CWTI_t + \varepsilon \quad (3)$$

where:

$OECD_t$  - average use of tax incentives in the OECD;

$NOC_t$  - the number of countries with tax incentives for R&D;

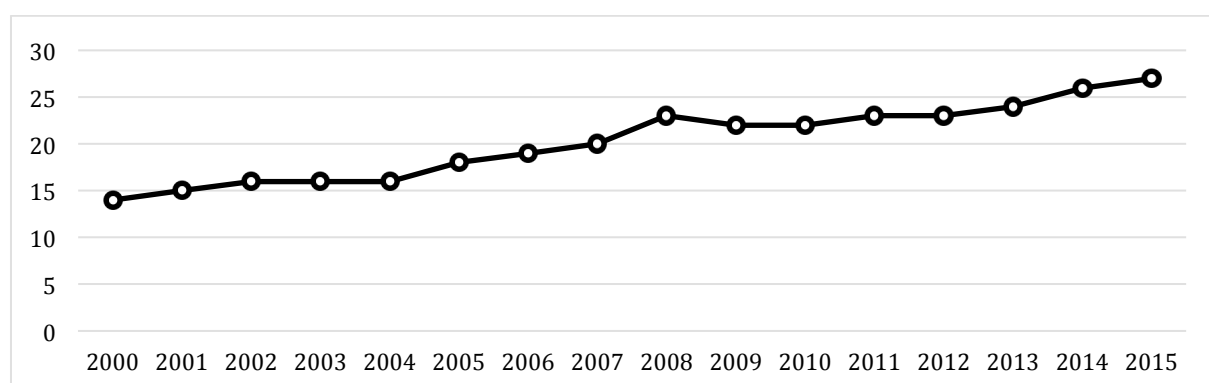
$CWTI_t$  - average use of tax incentives in countries with R&D tax incentives.

### 3 Results and Discussion

#### 3.1 Popularity of tax incentives

Although tax incentives for R&D were most popular in the 21st century, it should be noted that some OECD countries used these instruments much earlier. The first countries that introduced tax support for this activity were Canada (1944) and Japan (1967). In the next three decades of the twentieth century, the number of OECD countries offering tax reliefs for R&D was gradually increasing and in 2000 it amounted to 14: Australia, Austria, Canada, Denmark, France, Greece, Hungary, Japan, Korea, the Netherlands, Portugal, Spain, the United Kingdom, the United States.

Figure 1. Number of OECD countries with tax incentives for R&D in 2000-2015 (Source: Author)



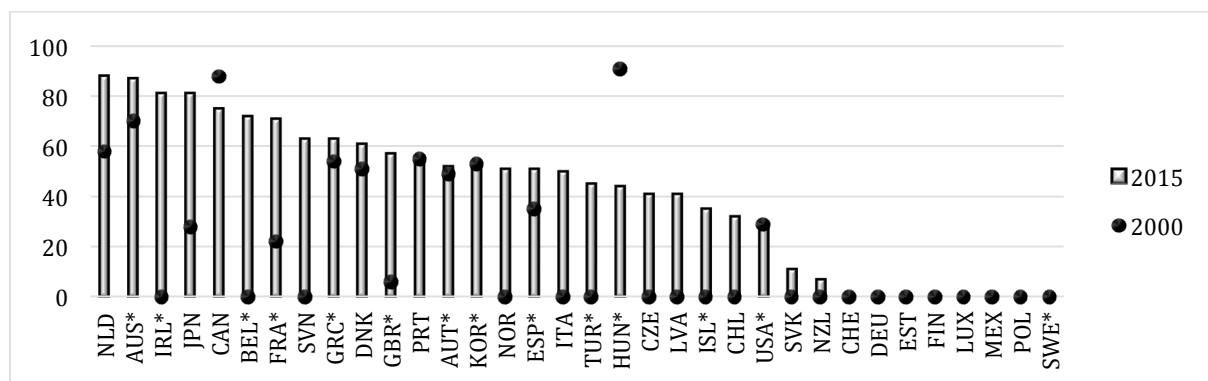
In the first fifteen years of the third millennium (Figure 1), the upward trend also continued. At that time, the R&D tax incentives were successively introduced by Mexico (2001), Norway (2002), Ireland (2004), Belgium and the Czech Republic (2005), Slovenia (2007), Chile, New Zealand and Turkey (2008), Slovakia (2009), Iceland (2011), Finland (2013), Latvia and Sweden (2014), Italy and New Zealand (again) (2015). Between 2000 and 2015, only 3 countries removed tax incentives: Mexico, New Zealand (2009) and Finland (2015). Portugal suspended the relief for R&D in 2004-2005. In 2015, tax incentives for R&D were used in 27 countries, almost double the 2000 and 77% of all OECD members. It is worth noting that in 2016 the R&D relief was also introduced in Poland and in 2017 in Mexico (again).

#### 3.1 Use of tax incentives

The use of tax incentives to finance private R&D activities by OECD countries varied widely between 2000 and 2015 (Figure 2). In 2000, tax funding represented the largest share of government support in Hungary (91%), Canada (88%) and Australia (70%). It should be noted that only in 6 out of 14 countries, which at that time were granted R&D reliefs, the value did not exceed 50%. Thus, in spite of the low popularity of tax incentives, most of the countries having them used them as the main instrument to support R&D activities. In 2015, indirect funding was most widely used in the Netherlands (88%), Australia (87%), Japan (81%) and Ireland (81%). Tax incentives accounted for no more than half of the support in 10 countries in 2015, so this year they were also the main way to support R&D activities in most of the countries that had them.

The highest increase in the use of tax incentives was recorded in Ireland (+81 pp), Belgium (+72 pp) and Slovenia (+63 pp). It should be noted that all three countries introduced R&D tax incentives during the period considered. Among the countries using tax funding throughout the period considered, the highest growth rates were recorded in Japan (+53 pp), the United Kingdom (+57 pp) and France (+49 pp). Only in 4 countries the share of indirect funding decreased between 2000 and 2015: Hungary (-47 pp), Canada (-13 pp), Korea (-1 pp), USA (-1 pp).

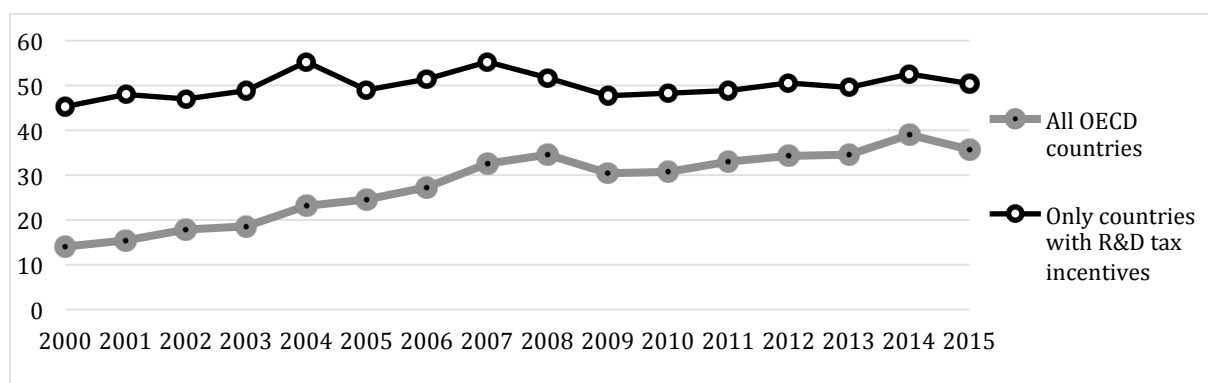
**Figure 2. Percentage share of tax funding in government expenditure in support of R&D activities in OECD countries in the years 2000-2015 (Source: Author)**



\* Countries where data availability is lower than 2000-2015: AUS (2000-2013), AUT (2004-2015), BEL (2000-2014), ESP (2002-2015), FRA (2000-2014), GBR (2000-2014), GRC (2005-2014), HUN (2004-2015), IRL (2000-2014), ISL (2000-2014), KOR (2007-2015), SWE (2000-2013), TUR (2000-2014), USA (2000-2013).

The average use of tax incentives in the OECD (Figure 3) was 14% in 2000. In the next 15 years (except 2009 and 2015), this share has been steadily increasing, reaching 36% in 2015, i.e. 2.5 times the amount of 2000. In total, in the years 2000-2015, the average use of tax incentives in the OECD increased by 22 pp, resulting in an average annual growth of 1.44 pp. The average use of tax incentives was also established only for those OECD countries that had R&D tax incentives in a given year. In this case, the average share of tax funding in 2000 was 45% and increased by only 5 pp during the period considered and amounted to 50% in 2015. The average annual increase (0.34 pp) was also much lower than for the whole organization.

**Figure 3. Average percentage share of tax funding in government expenditure in support of R&D activities in OECD in the years 2000-2015 (Source: Author)**



The discrepancy between the dynamics of tax incentives use in all OECD countries and only those with tax incentives for R&D indicates an important conclusion. According to the author, the increase in the popularity of tax reliefs for R&D, i.e. the introduction of tax preferences by successive OECD countries, has contributed most significantly to the increase in the use of tax incentives in the OECD. The use of tax incentives in countries that already had preferential tax provisions in this case was secondary in nature and contributed less to the increase in the variable value.

The validity of the above opinion was additionally verified by means of the linear regression model (Table 3). The model explains very well the variability of tax incentives use in the period considered ( $R$ -squared  $\approx 96\%$ ) and is characterized by high quality of parameters estimation (significance  $< 1\%$ ). According to the model, each introduction of tax incentives for R&D by one new country between 2000 and 2015 resulted in an increase in the average use of

these instruments in the OECD by 1.73 pp. While the increase in the average use of tax incentives by 1 pp in countries that have these instruments, increased the value of the dependent variable by 0.66 pp. Therefore, the growing popularity of tax instruments contributed to an increase in the value of the dependent variable in 87%, while the increase in the use of tax incentives in the countries that have them resulted in only 13% of changes.

**Table 3. Parameters of the model explaining the use of tax incentives in the OECD (Source: Author)**

	Coefficient	Std. error	P-value	Significance	R-squared	Impact on a dependent variable
<b>const</b>	-40.3722	8.19232	0.0003	*** (1%)		
<b>NOC</b>	1.73256	0.116853	1.59e-09	*** (1%)	0.957507	86.8448%
<b>CWTI</b>	0.664978	0.171087	0.0019	*** (1%)		13.1552%

### 3.2 Findings

Thus, the observed increase in the value of both the popularity of tax incentives and their use allows a positive verification of the presented research hypothesis. It should be confirmed that there has been a significant increase in the role of tax incentives in supporting R&D activities in OECD countries over the period 2000-2015. Such a result coincides with the OECD report [20], which also pointed to the increase in the importance of tax incentives in supporting R & D. However, in this study the importance of tax incentives is represented only by the number of countries that have this instrument (popularity). The use of tax incentives has also been estimated in the OECD paper, but was not interpreted at the level of the entire organization.

The study also led to an important conclusion on the reasons for the increase in importance of tax incentives in the first 15 years of the 21st century. The growing importance of tax funding was mainly due to the introduction of this support instrument by successive countries (popularity). The mere use of tax incentives in countries that already had these instruments has not increased as much as popularity and had little effect on the increase in importance of tax incentives. This conclusion raises two further questions, which the author will try to answer in his future research work. Firstly, what are the reasons for such an intensive increase in the popularity of R&D tax incentives in the 21st century? Secondly, why, despite the significant increase in the popularity of tax incentives, has the level of their use as a tool for funding R&D activities by the countries that have these instruments increased only marginally between 2000 and 2015?

In order to answer the first question, two main scenarios should be considered: optimistic and pessimistic. The optimistic scenario is to look at the merits of tax incentives as a reason for this, such as: low invasiveness to the market mechanism, rewarding higher-return projects and low transaction costs. As many researchers point out [5, 6, 24, 26], such features allow for effective support of R&D activities with this instrument. On the other hand, the pessimistic scenario, which is not so often mentioned in literature, should also be considered. It refers to the drawbacks of tax incentives in the context of good governance and the public choice theory. Due to difficulties in measuring and controlling expenditures, tax incentives entail low transparency of fiscal policy. For this reason, introducing (or promising to introduce) tax reliefs can become a "tidbit" for politicians during election campaigns. Governors may not be aware of, or deliberately conceal, the existence of budget expenditure related to the functioning of preferences.

The second question also requires an analysis of the effectiveness of the two instruments and political decisions related to them. Despite the fact that more and more countries are introducing tax incentives for R&D, the average expenditure related to them has not increased significantly in the countries with these instruments. The reasons for this phenomenon can be seen in the short experience with the study and implementation of this fiscal policy tool. For this reason, governments may be more willing to use direct funding which has a longer history of application.

## 4 Conclusion

The aim of the article was to examine the actual role of tax incentives as an instrument of fiscal policy aimed at supporting R&D activities of enterprises. The quantitative research carried out allowed the confirmation of the research hypothesis: In the years 2000-2015 there was a significant increase in the importance of tax incentives in supporting R&D activities in OECD countries. The increase in the value of both analyzed variables, the popularity of tax incentives and their use, contributed to this increase.

The study also made it possible to draw an additional conclusion of major importance for the analysis of this problem. The increase in the importance of tax incentives was mainly based on the increase in the value of the first variable, i.e. their popularity. The use of tax incentives has also increased their importance, but to a much lesser extent.

The study also allowed the formulation of questions that should contribute to a more in-depth analysis of this problem. Firstly, the reasons why the popularity of tax incentives increased rapidly in the first fifteen years of the 21st century should be explained. Secondly, the unresolved issues remain also the causes of the discrepancies between the dynamics of the popularity of tax incentives and their use in the countries that have these instruments. While the average share of tax funding in government R&D support in countries with tax incentives did not increase significantly during the period considered, many new countries have chosen to implement R&D reliefs in their tax systems. Further research works on this subject should attempt to answer these questions.

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# Do Gender Differences Impact Relationships at Work?

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## Abstract

Impartial institutions and public policies increase social and economic equality that regulates social capital [21]. However, social networks embedded in social capital may lead to different organizational outcomes for women and men [27]. Concept that strongly influence relationships in group environment is trust. Therefore, our research objective was to examine if there are gender differences in organizational trust among women and men in Slovakia. We assumed that these differences occur at interpersonal or organizational level in organization. The Mann-Whitney test was used to determine if a differences existed between females and males. No significant differences were found with regard to gender. There was just slight difference in organizational trust of respondents, with females (females; M organizational = 5,12) having a higher mean score (males; M organizational = 4,94).

*Keywords: social capital; gender differences; interpersonal trust; organizational trust*

JEL Classification:

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## 1 Introduction

Social capital is formed by relationships existing in organizational structures, that subsequently create economic value [6]. Social networks as a crucial component of social capital are based on trust, reciprocity, information and interaction [20]. First theory concerning social capital in the workplace was Burt's theory [4]. Author draw attention to gaps in organizational network and breaks in the flow of information among people that may lead to less efficient organizational functioning. Fukuyama [14] asserts that effective organizational cooperation is based on trust. Furthermore, organizations with higher trust environment are more open for innovation and development. According to Coriat and Guennif [8] sustained cooperative environment among employees is unrealizable in the absence of an insitutional framework that minimalize uncertainty and stabilise personal expectations regarding the act of conduct in recurrent situations.

### 1.1 Trust

Trust is multidimensional concept characterized as a positive expectation that another person will not exploit vulnerabilities involved in cooperation [23]. Decision concerning trust is based on the interpretation of person's intention and potential behavior [8]. According recent research findings, opinions about development of social trust are not clear. There is no consensus about extent to which trust is instilled in initial childhood phases or formative experiences [9, 27]. As Rousseau et al. [24] noted, trust is concept that combines microlevel psychological processes and group dynamics from macrolevel institutional point of view.

### 1.2 Trust and gender

Even though personal trust is formed in the earlier phases of life, organizational trust is reinforced by supportive environment and networks, that may be perceived differently by women and men. If some differences exist in trust levels based on gender is questionable. Gender system of western culture is defined by gender isolation referring to expectation for gender roles resulting in certain behavior [2]. Hofstede [15] claimed that differences between men and women at workplace exists. Men working in organization focus more on income and progressions referring to masculinity and competition, whereas women focus more on building

good relationships with their managers and colleagues referring to femininity and caring [15]. Timberlake [27] states, that even though men and women may come to organization with similar human capital referring to intelligence, education and skills, outcomes of their career may be influenced also by social network and contextual conditions. Metz and Tharenou [17] conducted qualitative and quantitative analysis to find out if human or social capital helped to the advancement of women in the banking industry at different levels of the organization structure. Results from the qualitative analysis showed that social capital played an important role in career advancement at the upper level of organization, where the ability to cooperate and utilize networks is crucial for progression. Therefore, another pertinent factor influencing social capital is social network applied in information, experience and resources sharing [6]. Willingness to share information and experience is advanced by trustful relationships. From supervisory perspective, Conn [7] found out that women exhibit greater trust in supervisor than man. Phelps-Jones [20] examined trust between pastors using mixed method design, based on quantitative and qualitative analysis, and ascertained null effect of gender on trust levels. Another great body of research did not find any significant differences in trust of women and men in school sector, telecommunication sector, technician and management [26, 28]. These empirical findings, contradictory to Hofstede theory [15], led us to examine gender differences in organizational trust in slovak organizational environment. As proposed by the theory [15], it was predicted that emphasis of women on relationships will lead to different interpersonal and organizational trust perceptions.

## **2 Material and Methods**

Design of our research was comparative, based on questionnaire method. Organizational trust was measured by the OTI, Organizational Trust Inventory [16], that is originally composed of twelve items focused on interpersonal and organizational trust. Our research sample consisted of 152 respondents, 102 women and 50 men. Instrument was filled by 23 managers and 129 specialists. Most respondents worked for small firms (72), following medium-sized (46) and then in large firms (34). Employees originated particularly from private organizations (124) and others (28) from public organizations.

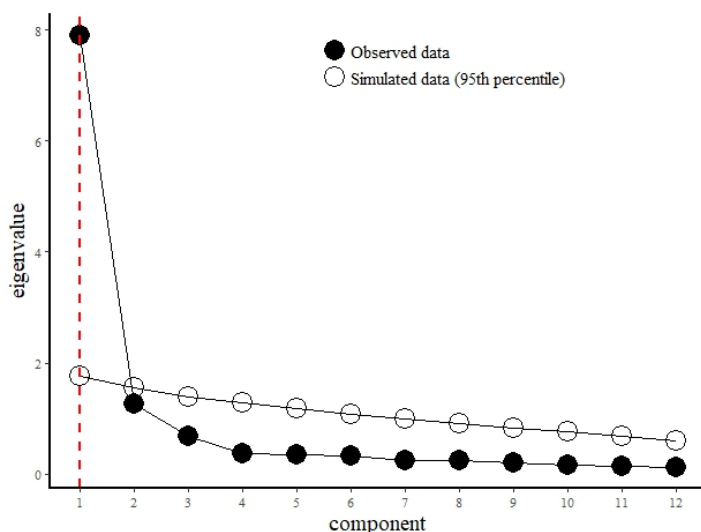
### *Apparatus*

Organizational Trust Inventory (OTI) was created by Nyhan and Marlowe in 1997 [16, 5, 18]. Instrument consists of twelve items and belongs to most commonly used trust measurement tools in organizational context. Original version of OTI measures interpersonal trust defined as trust toward immediate supervisor, saturated with eight items and organizational trust referring to attitudes of trust that employees feel toward their organization, saturated with four items [3, 18, 5]. This questionnaire was translated to slovak language and corrected by language. Following translation, we conducted a pilot test to find out the clarity and correct formulation of items. We used seven point Likert scale ranged from nearly zero to near 100% across all items.

### *Factor analysis*

We used factor analysis in order to assess the dimensionality of Organizational Trust Inventory.

**Fig.1 Scree plot**



We performed parallel analysis, that is considered to be a best technique aimed to indicate how many factors retain in the model [12]. This simulation-based method compared eigenvalues of simulated data alongside observed eigenvalues on the same scree plot. Scree plot (Fig. 1) extracted just one component which eigenvalue exceeds 95th quantile of simulated eigenvalues [25].

**Table 1. Goodness-of-Fit Indicators of Models of Organizational Trust Inventory (Source: Author)**

Model	$\chi^2$	df	GFI	RMSEA
<i>Research sample (N=152)</i>				
Single Factor	27,40	44	1	0
Two factor	14,34	43	1	0

Then we performed confirmatory analysis, that showed possibility of reduction all items to one main dimension, even though original version of instrument indicated two-dimensional structure. Major fit indices for single factor model of  $\chi^2 = 27,40$  (df = 44, p = 0,98) and RMSEA  $\approx 0.00$  are adequate, even though the two factor model has better fit on data. PCA indicated insufficient communalities for two items, so we decided to remove them. Based on parallel and confirmatory analysis, we may conclude that all items are represented by one global factor that provides information about organizational trust. Overall instrument of organizational trust had Cronbach  $\alpha = 0,97$ . OTI meets all necessary psychometric reliability criteria.

### Procedure

Criterion for participation in research was full-time employment. At the beginning of the questionnaire employees responded to the items regarding type of position, education, gender and age of participants. Subsequently, respondents filled Organizational Trust Inventory. Respondents were adequately informed about the research objective and anonymity in accordance with the APA ethical principles.

## 3 Results and Discussion

Man-Whitney test was performed to determine whether trust levels of women differed from trust levels of men. Our data met all assumptions for using Mann-Whitney test for analysis: our data were not normally distributed, dependent variable was measured at the ordinal level and our sample consisted of two categorical independent groups [12]. Table 2. indicates, that

organizational trust levels for women (Mdn = 5,70) did not differ significantly from men (Mdn = 5,20); U= 2313; z = -0,930; ns; r = -0,08. Hypothesis was not confirmed.

**Table 2. Results of Mann-Whitney test for overall organization trust score**

Trust	Women (n <sub>1</sub> =102)			Men (n <sub>2</sub> =50)			U	p	r
	M <sub>1</sub>	SD <sub>1</sub>	Md <sub>1</sub>	M <sub>2</sub>	SD <sub>2</sub>	Md <sub>2</sub>			
<b>Organizational</b>	5,12	1,57	5,70	4,94	1,53	5,20	2313	0,35	-0,08

The aim of our research was to examine gender differences in organizational trust. Our hypothesis was not confirmed. There was not significant difference between interpersonal and organizational trust of men and women. Our results are in line with the research of Turner [28], and Tasdan [26], that did not find any significant differences in trust levels based on gender. These results may reflect same opportunities and approach from management toward men and women and equally supportive organizational culture. In general, employees perceived rather greater organizational trust obtained from mean scores. We may consider these results as positive, in comparison to survey of DeVita [10], that found 70% of employees did not trust their management. There are several factors that may lead to these results. First of all, most employees were employed in private and small organizations that are not affected by hierarchical structure and distant relationships. That may cause rather positive perception of organizational trust. Organizations with a few employees are flexible, open and communication is transparent to a greater extent, which may lead to similar conduct toward men and women. Another explanation is trustful organizational culture, that is current trend of regulation mechanism. Community based on trust is more typical for informal organizations, where knowledge sharing, creativity and innovation are crucial principles of organizational success [1]. These values of organization are valid and accessible to men and women equally. However, mean scores showed that women experienced organizational trust to a mildly greater extent. This one slight difference in mean scores may be explained by emphasis of women on relationships [15].

**Table 3. Results of Mann-Whitney test for overall organization trust score**

Trust	Public (n <sub>1</sub> =28)			Private (n <sub>2</sub> =124)			U	p	r
	M <sub>1</sub>	SD <sub>1</sub>	Md <sub>1</sub>	M <sub>2</sub>	SD <sub>2</sub>	Md <sub>2</sub>			
<b>Organizational</b>	4,63	1,84	5,20	5,16	1,48	5,70	1483,50	0,23	-0,09

In addition, we decided to examine organizational trust levels of employees from private and public sector. Table 3. showed, that organizational trust levels of employees from public sector (Mdn = 5,20) did not differ significantly from employees in private sector (Mdn = 5,70); U= 1483,50; z = -1,201; ns; r = -0,09.

Higher level of trust lead to higher effectiveness and performance of company [14], therefore we decided to further examine which type of organizational structure possess prerequisites for it. There are two main characteristics in the literature, that differentiate between public and private organization. Red tape and goal ambiguity are usually more prevalent in public organizations [22]. These features may cause lower empowerment feeling of employees and it may lead to organizational trust reduction [19]. Even though statistical test did not find any differences between trust level in public and private organizations, mean score of trust in private organizations is slightly higher. Our results suggest, that organizational relationships in public sector may be more distant than in private organizations.

There are some factors typical for behavioral sciences research that need to be considered in evaluating findings of our research. Comparative design of our research consisted of self-

report Likert scales. Although we have assured respondents about anonymity of responses, our instruments consisted of several sensitive items, that could lead to social desirability bias. Second factor influencing our results may be current state or affectivity of the respondents. Third factor that may possibly limit our results is unequal sample size.

#### 4 Conclusion

In conclusion, our research put emphasis on trust as a crucial component of vertical and collaborative horizontal relationships encompassed in social capital and as antecedent of organizational commitment. Social theory suggests that women prioritize relationships, hence we predicted gender differences in trust. We did not find any significant differences in organizational trust of men and women. In general, the score of organizational trust reflecting organizational culture was rather high, which is in the era of globalization and competitive struggle positive result impacting not only the quality of life of employees but also economic success of organization itself [1, 11]. Our research may serve as foundation for future studies, that compare organizational trust levels in various sectors. Another interesting conclusion may be drawn from the data, that investigate also gender of supervisor.

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**SESSION IV: INTERMUNICIPAL  
COOPERATION AND REGIONAL  
DEVELOPMENT**

# Quality of Regional-Policy-Making as a Determinant of Improvement of Educational Establishment?

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## Abstract

The aim of this study was to prove that foresight can be a tool that enhances the ability of an effective, strategic regional planning. In the following paper an attempt was made to evaluate the regional policy-making of the Central Pomerania Region in Poland, which determines the functioning and the development of public organisations, with the main focus on the upper secondary schools' establishments. A literature analysis and an empirical verification of the public opinion survey of 340 respondents was conducted for the purpose of this study. The total survey data received from 240 general secondary school students and 100 students of specialised secondary schools was used to acquire knowledge about expectations and opportunities for the development of youth and served as the basis for a logical forecasting attempt. Research shows that responsible regional policy-making can significantly influence the management of educational establishments and at the same time have an impact on the quality, the knowledge, the effectiveness and the attractiveness of said establishments. The objective of the study was to prove that regional policy-making should be supported by modern strategic management tools such as the foresight research, as it can more effectively identify areas that can increase the attractiveness of a region, the competitiveness of public institutions (educational, private and state establishments) as well as activate entrepreneurship by using an appropriately educated human potential.

*Keywords: foresight; management; organisation; development; education*

JEL Classification: R110, O310, I2

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## 1 Introduction

Development of entrepreneurship, globalism, digitalization, networking, rising expectations and demands of stakeholders generate to many variables that determine the shape of the future. The evolution of strategic tools used in the process of strategy development has forced, especially in the area of public policy (national, provincial and local-regional), the use of foresight. Foresight, although ambiguous, is defined as a set of activities that allow for a multidimensional identification of future directions of development on the basis of the current state of science, technology, social awareness and their interrelationships [25]. From the perspective of regional policy, foresight, as the ability to create the image of the future by the identification of areas that may have a competitive advantage, seems quite important. Education is one of such areas. Especially when the development of competitiveness in many areas of life and the constant improvement of work quality in organisations (often by standardized management systems) can lead to a situation where geographical location and conditions associated with it may determine the development of the regional educational market [1]. An ongoing demographic decline forces junior high schools and upper secondary schools to compete for pupils in terms of both the potential of the establishment that they can use and also from the economic point of view. It is important to remark that the achievement of high economic growth by territorial (local) units is possible, among others, by a group of key success factors, which often reflect the ability to identify and strengthen the regional potential - often related to innovation policy [7;15]. This occurs at all three levels of division of the local government, i.e. national, provincial and regional policy. The study seeks to prove that foresight is an appropriate tool in the process of shaping a strategic regional development based on: the innovation, active stakeholder co-operation, identification of opportunities and threats as well as

abilities and potentials and defining activities and time horizon. In other words, it can be said that foresight influences the quality of created and implemented regional policy.

## 2 Literature review

The development of local government units, implemented within the framework of the regional development policy, has strongly influenced local potential and initiatives supporting entrepreneurship. Economic initiatives, often included in regional development strategies allow to activate local entrepreneurship within the so-called clusters or economic zones, accepted by the local public and the broadly understood administration. This promotes the use of regional potential that results from the location, the level of urbanisation and the labour market. In other words, from the level of competitiveness of the local government unit and its stakeholders. The ability to compete and shape innovation as a part of the region's creativity should be the responsibility of the authorities and a challenge for the stakeholders of the region. The results of the development of the region are quality oriented activities implemented in various regions, which through correlation and stakeholders activity (also within the framework of cooperation [12]) directly influence innovation, the GDP growth, the number of newly established entities, the unemployment rate. Therefore, shaping of regional development is often the result of the entrepreneurship of the local public authority [21], oriented by the government strategic documents, i.e. Long-term National Development Strategy Poland 2030 [6], report Poland 2030 Development Challenges [19], National Strategy of Regional Development 2010-2020. Regions, cities, rural areas [10] that serve as foundations for planning the future of a given region must create its own vision for the future and on how to achieve the objectives. The author assumed that future concepts must include interactions in the areas of economy [4], society, ecology [16] and technology [14], as they determine the direction and pace of regional development [9].

The need for a modern look at management perspectives, which includes the use of modern management tools, favours the use of foresight as a modern planning tool that indicates the most socially accepted sectors of the economy and actions that should focus on financial aid to improve business conditions (preserving or increasing economic benefits of the country) [5;7]. For this purpose, it seems quite important to determine the type of foresight that is going to be used in accordance to the following criteria [15]: territorial (i.e. national, sub-national, regional, metropolitan etc. type of foresight), functional (i.e. development policy, prioritization, education type of foresight) or the subject matter (i.e. territorial vision, technological and entrepreneurial dynamics type of foresight) or any other type or mixed type of the mentioned ones.

Literature research indicates the multifaceted use of foresight, most commonly associated with economics and business, public administration, engineering, environmental and ecological sciences, technology, energy and fuels as well as law and heavy industry [15;27]. What it means is that in Poland, as well as in the rest of the world, foresight projects were initiated and financed by the country [17;18]. This was confirmed by the available studies concerning projects development [8;18;5]:

- in North-West Europe 479 studies (in Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxemburg, the Netherlands, Norway, Sweden, Switzerland and England),
- in Southern Europe 69 studies (i.e. Cyprus, Greece, Israel, Italy, Malta, Portugal, Spain, Turkey),
- in Eastern Europe 38 studies (Armenia, Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia, Slovenia and Ukraine)
- North America 109 studies (Canada and United States of America),
- South America 114 studies (Argentina, Brazil, Chile, Colombia, Peru and Venezuela),
- Asia only 51 studies (China, India, Japan and South Korea).

The analysis of the effects of foresight in shaping the future by local government authorities indicate the continuous need for planning processes that shape the creation of entrepreneurship, designate technological areas (based on innovation policy) along with mega

trends as well as activate of stakeholders (through education [26] and computerisation [1;22]) in active participation in the process of the region's development.

In Poland, in 2003-2005, due to the execution of the pilot Foresight Project in the area of Health and Life, foresight has become a tool that ensures predictability of technological and socio-economic development; in the strategic planning process for the public and private sectors (paying particular attention to the use of external funding sources within the EU programmes i.e. Cohesion Fund, Regional Operational Programme); a social dialogue that integrates and stimulates the discussion and cooperation of stakeholders (societal stakeholders), with a special focus on decision-makers and the scientific community [15]. Growing interest in this type of activities resulted in a decision to launch in 2006 a National Foresight Programme "Poland 2020", where in years 2006-2008 works were carried out in three panels of research fields: "Sustainable Development of Poland", "Information and Telecommunication Technologies" and "Security". In 2003-2013, a number of the following foresight project activities were carried out in Poland [14;11;9;13]: national 4, regional 13, industrial 20. These numbers are constantly increasing, what indicates that this modern strategic management tool is very well suited to the methodology of regional development, including education being a part of the public sector [20].

Educational establishments, regulated by law [23] and supervised by local government authorities, is of a widespread nature as must be able to educate stakeholders (in different age groups). In the framework of continuous educational reform, as a strategic development area of the country in 1999 [24], the stages of education were changed, through the introduction of junior high school, between primary school and secondary school, which included general secondary schools, technical schools, vocational schools and specialised secondary schools. The solutions were designed to promote equal educational opportunities for the students without having to analyse factors of business nature outside the educational system. In the face of such a revolutionary change, the quality of the process, the approach/form of education must be subject to continuous improvement in order to achieve variable learning outcomes [2]. This means that schools have become target-oriented organisations characterized by different parameters such as efficiency, economy and profitability. To this end, institutions had to: acquire, improve and adequately manage staff with appropriate pedagogical qualifications, enhance the educational programme through extra extracurricular activities, and utilise marketing tools necessary to create the positive image of a modern, friendly school. Many educational institutions did not manage to cope with this task, and in particular with the emergence of non-public entities increasing competitiveness in the region. That is the reason why municipalities were forced to close down many primary schools and post-gymnasiums. Entities that managed to preserve are the ones that were managed in the best manner, with the highest quality education, specialised and with the most positive image. Presently, in 2017 a reform of education system was carried out [22], which restores the state and part of standards from 18 years ago.

### **3 Research methods**

The respective literature reflected the fragmentary nature of the scientific knowledge in the field of a sustainable development. The authors of the cited publications focused on the sources of development, the tools, the methods of creating development also related to education and in particular, to educational establishments.

For the purpose of verifying theory with practice, empirical verification of the public opinion survey data was conducted. The survey was undertaken from 10 to 30 September 2016 by using a proprietary questionnaire consisting of 16 questions. The research group (340 in total) were students in 6 upper-secondary educational establishments: 240 general secondary students (4 establishments) and 100 specialised secondary school students (2 establishments). The selection was random. The research group is not a representative group. The author, however, made an effort to perform logical forecasting by focusing on the following research problems:

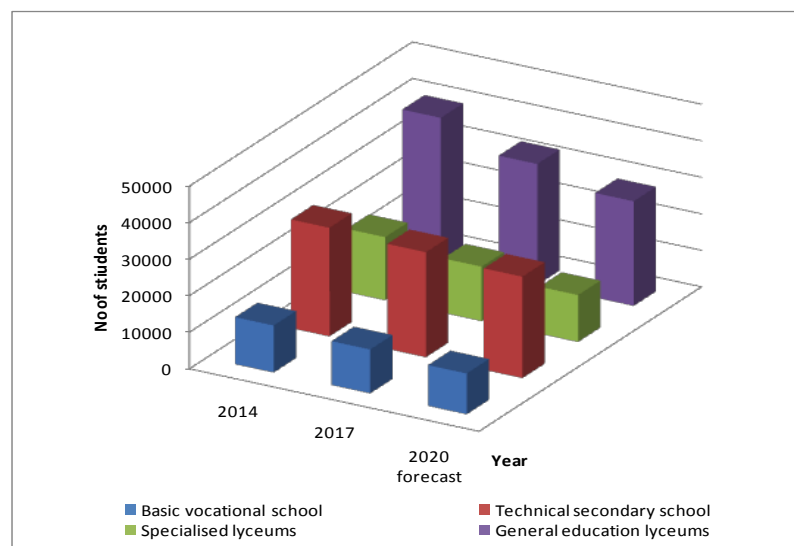
- Q1: Can the quality of regional policy initiate the competitiveness of educational establishments through the development of regional entrepreneurship?
- Q2: Can the strategic directions of regional development generated by foresight determine the quality and competitiveness of the region, including educational institutions?

The research conducted in the Central Pomerania region, is to prove that regional policy, supported by a foresight research, can increase the competitiveness of public institutions (private and public educational institutions) in specific areas and stimulate entrepreneurship using properly educated human potential.

#### 4 Research results

In analysing the theoretical and practical considerations of foresight, one can conclude that demographic decline in 2015-2020 will significantly influence the regional policy, national education included, of the Central Pomerania region (Fig. 1) and have a direct impact on entrepreneurship. This may mean that demographic decline might be one of the main determinants of the development of a region. Demographic decline in education has a direct impact on business demography, understood as dynamics of the emergence of new economic entities and closing down already existing ones.

**Figure 1 The number of students of upper-secondary schools in Central Pomerania region in 2014-2020. (Source: [3])**



The figure shows that schools, which are teaching profession are particularly popular in the Central Pomerania region. This is very important for the identification of areas and directions for future regional policy. The analysis of the region indicates that there are enclaves of a single industry in sub-regions such as agro-food, furniture, plastics, tourism and wood, energy.

Taking under consideration the type of carried out business, the following trade sections with the highest share (rounded to a unit) in 2015 are: trade 24 %, accommodation and gastronomy 17%, construction 15%, industry 11%). The lowest share was public administration 1%, national defence 1%, information and communication 2%, financial activity 2% and culture and recreation 3%. Socio-economic changes in the Central Pomerania region, as well as, to some extent, political changes in the country, have led to the development of vocational education as one of the most important and for entrepreneurship to look for corresponding human capital.

The regional policy of the Central Pomerania region, within the framework of carried out activities for strategic planning, in the area of development of vocational education and regional entrepreneurship, was focused on:

- active interaction of a venture - an educational establishment based on the exchange of information about planned and existing needs of the qualified staff (youth), cooperation of subjects (through practices, lectures, inspiration with new technical solutions, etc.)
- shaping business clusters,
- creating new profile studies/ courses of study (also within the framework of patronage classes),
- professional activation supported by various external funding sources,
- support from public-private partnership,
- creation and development of local economic zones (legally authorised to function until 2026),
- raising pro-innovation awareness - as part of activities of regional business-related organisations (Regional Development Agencies, Chambers of Commerce, etc.),
- attracting large business operators with high level of technological development i.e. Espersen Poland LLC (Denmark), Elfa Manufacturing Poland LLC (Sweden), GinoRossi (Italy), Dajar LLC (Poland), Jeronimo Martins Poland Inc. (Portugal), Rotho LLC (Switzerland), Schwarte-Milfor LLC (Germany), Kronospan (Poland), etc.,
- as well as other forms of intended support.

By looking at the above data, from the point of view of conducting business activities in the region, it is important to promote the idea of vocational education and its superiority over general education in the current requirements and challenges of the labour market. Therefore, it is necessary to separate key competences vital to the labour market and industries essential to the region. This can be achieved (under the new reform) by bringing back the three-year vocational schools and decommissioning of profiled secondary schools that have not succeeded in practice.

From the currently initiated processes stimulating entrepreneurship, one can distinguish activation of stakeholders (through education and computerisation), which supports organisations that are setting the trends in the following trades: wood and furniture, food, energy, logistics and tourism. Utilising both the tourism potential and the landscape of the Central Pomerania region is positive for attracting investors. High unemployment and vocational training raises only the existing efficiency of costs incurred. It should be stressed that the local administration favours all new forms of economic activity that activate society, especially in the field of specialised education, which generates high costs of youth education and at the same time takes care of the environment.

It should be noted that contrary to private educational establishments, public institutions, acting on a non-profit basis, with limited subsidies from local authorities, try to provide attractive educational offer (in line with current needs of the labour market) and "benefit package" (scholarships, tablets, equipment, playgrounds, climbing walls, computer laboratories, etc.) in order to attract as many potential students as possible.

According to the analysis, the decision on choosing a school was mostly dependent on attractive specialisations - 33%, quality teaching (high success rate of passing vocational exams, student activation, etc.) - 21%, friendly atmosphere - 16%, friendly teaching staff - 14%, extracurricular activities - 11%, school resources (equipment, accessibility to modern IT solutions, etc.) - 5%. This means that young people more often tend to look for new fields of study, hoping to find a more attractive employment in their profession. This is confirmed by 22% of pupils, where 23% is planning to continue education, 17% have no plans for the future, 13% wishes to work (regardless of which profession), 11% is planning to go abroad and 7% will run their own business.

As many as 84% of the respondents did not pay much attention when choosing a school, whether it should be a public or a private school. This is the result of a more effective management of public entities in the fight to encourage students to choose and improve the

attractiveness of the educational offer. It is worth noting that private schools receive additional financial support (most often from the city office and the EU funds) to provide educational services and reduce financial burdens for students (their families). This results in the development of the competitiveness of educational institutions, which will positively affect both the demand-supply side. It is confirmed also by the research, as more than 70% of respondents indicate that they are satisfied with their choice of educational institution and only 6% takes a negative view. The research results, listed above, indicate that the growing competition of educational establishments (especially those with a vocational profile), directed towards closer cooperation with the economy, within the framework of the science-economy, is a part of improving the quality of regional policy.

## 5 Discussion of the results

The results of the literature research indicate [6;10] that the regional policy (in the Central Pomerania region), especially the quality of regional policy-making, will have a direct impact on the development of entrepreneurship, social and economic activity and educational institutions. It should be noted that the ability to shape policies, i.e. by using foresight [13;16], will allow to determine such mega trends and directions for regional development that might minimise the risks resulting from: globalisation (European integration in all areas of socio-political and economic life), internal reforms (the ability and necessity of implementing significant reforms stimulating market mechanisms), knowledge-based economy (creation of the science-economy transfer of knowledge ensuring efficiency, innovation, quality in cooperation and development of R&D units) and social acceptance (achieved through the support and recognition of implemented reforms and the effects of technological progress).

Strengthening cooperation with local business entities, which create the labour market, might allow for the implementation of vocational education that would result in the selection of a talented group of potential employees. It is therefore relevant to shape an appropriate awareness of the youth in relation to an opinion that education is amongst the highest values; regardless whether gained in a private or public school (confirmed by the research). It should be highlighted that despite the ongoing education reforms in Poland, educational establishments in the Central Pomerania region have been positively evaluated (confirmed by the respondents), which reflects the appropriate way of managing the institutions and the support of local authorities. It is necessary to develop the process of improvement [1;8] with the cooperation with business entities within the framework of apprenticeships and didactic visits. The implementation of such actions will allow to adjust the level and the scope of education to the market needs. In other words, this means that potential employers are guaranteed a trained staff in accordance with the presented expectations and needs, and educational institutions implement the "concept of existence / appointment" – by ensuring the obligation of education, they meet the expectations of stakeholders and increase their satisfaction.

An important finding of this study is that as many as 43% of the respondents wants to leave in order to improve, of which 22% seek more attractive forms of education, which forces educational institutions to be more involved in the implementation of innovative forms of education [confirmed by 1;20;21;22]. It is worth noting that 17% of the respondents have no plans for the future, which is why universities (as well as the local government) should increase the number and the intensity of promotional and information activities, concerning the educational opportunities of educational institutions in the region as well as their effects (opportunities for obtaining work).

The shaping (at this stage of youth development) of the "employee potential" in this manner, which will be constantly improved, allows to build a friendly image of the region and the conditions for the development of entrepreneurship. The survey showed that as many as 7% of the respondents want to operate their own business, which may positively affect the development of the region. It should be borne in mind that the proper shaping of the business environment in the Central Pomerania region results from the fact that organisations (from

various industries) are increasingly investing, creating both partner companies, representative offices, as well as transferring their production lines or company headquarters. This means that the benefits are trilateral. This means that the benefits are trilateral (educational institution, local government, entrepreneurs). Therefore, the economy, as part of a regional policy, must be carried out prudently but with a visionary view of the future. It should be highlighted that Poland still does not have a characteristic, shared, clearly defined direction of the "public-private partnership" development (trilateral cooperation) in the field of education at the regional level [6;10]. Despite the slow development of cooperation between educational establishments with the business entities and the business environment (the number of inquiries about the possibility of cooperation increases annually), confirming the trend of growing demand for the local potential with the demographic decline, it is necessary to increase the activity by highlighting strengths of the Central Pomerania region and the opportunities for entrepreneurs resulting from it. This means that the potential of the region is high, and through the quality of regional policy shaping it can be further developed or limited.

## 6 Conclusion

Contemporary development strategies and the development of competitiveness in the Central Pomerania region indicates the need to reorganize the funding of education functioning, in particular the extension of schools' activities within the science-economy interaction. The quality of regional policy development in the Central Pomerania region allowed to:

- increase competition for specialized human potential with existing demographic decline,
- increase the role and importance of educational institutions in shaping the professionally profiled youth and thus making the labour market more attractive,
- more attractive educational offer and quality of education,
- initiate creation of a more effective education system based on identified expectations and requirements of stakeholders,
- possibilities of obtaining external financing sources, i.e. the EU funds as part of the targeted projects implementation,
- shaping the development of the local socio-economic environment,
- improve the image of educational institutions.

By analysing the above data, it can be stated that educational establishments will look for new ways of development, improve the quality of education, ensure the attractiveness of the educational offer that meets the expectations and requirements of the rapidly changing labour market, while minimizing the risk of demographic decline. Achieving this goal is possible through a well-established regional policy, which will support, through various quality-oriented activities, the development and interest in the region's potential. Economic activity and educational institutions must strongly cooperate to become a "multi-field exchange areas" of experience, knowledge, skills, etc., creating a more effective educational system with increasing attractiveness of the region.

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# Micro Regions as Product of Intermunicipal Cooperation in Czech Republic and Slovakia

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## Abstract

Municipalities often cannot solve their problems on their own. Therefore, they cooperate with other municipalities to reach common development. One possibility of cooperation is to create common micro-regions.

This paper is focused on micro-regional municipal associations in Slovakia and voluntary municipal association in Czech Republic, both with multi-thematic object of activities, situated in Czech-Slovak borderland. The research question is : What are the differences in functioning between Czech and Slovak micro-regions? We used case studies of these micro-regions, we checked their bylaws, system of funding and we also used interviews and talks with their bodies and member municipalities about causes of formation of micro-regions, benefits and disadvantages connected with.

Legislation, object of activities, system of funding, benefits and disadvantages are very similar in both countries. Causes of their formation are mainly common implementation of activities, common development, marketing and drawing EU funds (in Slovakia) and common marketing, performing competencies and reaching national and regional subsidies. In Czech micro-regions, there exists function of administrative-executive employee responsible for running of micro-region, its marketing and communication.

Slovak and Czech micro-regions both can use similar policy instruments including creating infrastructure, common marketing and creation and implementation of strategic documents, but in Slovakia, these documents often do not exist. In general, we can state that Czech micro-regions are more active than Slovak. They have their own websites with bylaw, organisational structure, contacts, strategic documents, budgets and internal directives. Czech micro-regions members meet more regularly against Slovak. In Slovak micro-regions' websites there is problem to find out bylaw or budget and they are not willing to communicate with external environment.

All the members responded their membership met their expectations and gave them more advantages than disadvantages. Advantages are common organisation of events, application of funds, mutual learning, and more effective perform of services. They perceived only administrative burden and compromises in decision-making as disadvantages of membership in micro-region.

*Keywords: micro-region; municipal cooperation; micro-regional municipal association; voluntary municipal association*

JEL Classification: H70, H83

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## 1 Introduction

In recent years European municipalities faces to pressure from public administration representatives, experts and inhabitants, who expect performance growth, savings and changes in providing of public services. Mainly small municipalities found out that meeting the requirements of their residents (which lead to quantity and quality growth in public services) without tax burden changes, is unrealisable and threaten their existence.

There is typical fragmented settlement structure and structure of administration in Slovakia and Czech Republic, characterised by many small municipalities to 1000 inhabitants [15]. This small amount of residents lead to other problems as low financial base, high share of administrative expenditures [2], low tax income, insufficient infrastructure, weak quality of personal resources. All of them influence municipalities operation and development.

One way how to solve these problems is municipalities' cooperation, which can take various forms. In our research we will focused on micro-regions as one form of the municipalities associations, which allow exchange of experience, increase of quality of provided services, common implementation of financial, material and personal difficult projects.

The aim of the paper is to bring information about micro-regional associations operation in Czech and Slovak republic, mainly their comparison, motives of origin and review some advantages and disadvantages. We used case study of selected associations. We analysed their main documents, bylaws, systems of funding, websites and then used interviews and talks with micro-region bodies and also with their member municipalities. We asked them about causes of formation, benefits and disadvantages of their membership.

### 1.1 *The status of micro-regions in regional development*

Filo defines region as a connection of geographically closed areas with strong neighbourhood contacts based on historical grounds, of these, the smallest unit is the micro-region [6]. By Hartshorne region is a basic geographical unit where unique and unrepeatable phenomenon are and these features different it from others [9]. The municipalities usually associated in micro-regions have common backgrounds (natural, cultural, historical conditions, common interest in development) or they are functionally connected by infrastructure or land gradient.

Some authors defined micro-region as institution in which some municipalities, geographically or economically connected, manage multimunicipal problems or plan their development together. In public administration view, it is usually purpose-built association of several municipalities to reach specific aim. Its typical character is active origin from the bottom up, based on willingness and own initiative.

By Slovak legislation micro-regional association is “legal person established to receive common solutions to increase level of economic development, social development and territorial development of region” [19]. In Czech legislation there is no definition of micro-region. By OECD, Czech institutions use this expression to mark sub regional territory smaller than NUTS III [11], understood as consensual union of municipalities (dobrovolný svazek obcí) which may have different legal personality status.

Micro-region can be understood as a new level of administrative unit that ensure tasks of the self-government. This was proposal of communal reform of self-government operation in Slovakia. There was an idea about merge of municipalities or their connection to the city. The aim was a higher effectiveness of public services and better financial, personal and infrastructural capacities [10].

All the definitions have these common characteristics: territory (geographical neighbourhood), specific degree of homogeneity (common intention), smaller size region and voluntary cooperation.

Small municipalities (to 1000 inhabitants) are very important component of area of settlement structure, including Slovakia and Czech Republic. By population and housing censuses 2011 in Slovakia there was 2890 municipalities, more than 66% were small municipalities with only 15,9% residents (from total Slovak population) [16]. By population and housing censuses 2011 in Czech Republic there was 6251 municipalities, more than 77% were small municipalities with only 17% residents (from total Czech population) [3].

Fragmentation of local management may influence quality of life of inhabitants, but also effectiveness of management. These municipalities can be considered as less efficient than could be [12], here is danger of individual solving of environmental, cultural problems and problems of social polarization, but these problems cannot be solve only locally. One of the way to solve these problems is flexible cooperation from bottom up based on voluntary coordination of investments and activities or municipal partnership.

There are 3 main arguments in favour of municipal cooperation:

- There are economies of scale which originate where unit costs decrease with increasing total provided services [4] it leads to U-shape costs curve [1] and makes administrative units more effective. The most direct evidence can be seen in administrative expenditure [14].
- Cooperation allows mergering and leads to higher personal, financial and material capacity [18], mainly in the case of cooperation of small municipalities with weak

capacities and lack of resources. It allows provide wider range of services, with higher quality and development of municipalities.

- There aren't negatively influences on democracy. Cooperation is not too drastic than amalgamation [5], its more convenient [17]. It does not endanger democracy, municipalities' autonomy and political enforcement.

## 2 Material and Methods

In our research, we used case study method, where we identified association members' attitudes and compared municipal cooperation in Czech and Slovak republic.

We focused on two regions, one in each country- Trnava region (SR) and Jihomoravský region (CR) because of their geographical, natural, transport, cultural proximity and cross-border links.

In Trnava region there are 35 associations, therefrom 18 is in border area. 10 associations are monothematic (focused on construction of water pipe, sewerage or waste management) and 8 are multithematic. In Jihomoravský region there are 134 associations, therefrom 48 are in border area. 23 associations are monothematic (oriented in construction of water pipe, sewerage or sewage treatment) and 25 multithematic (Table 1).

In setting of border area we based on Halás who says that territorial criteria is one way how to define border region [8] . We based on geographical distance including border crossings and road accessibility. Our criteria was maximum distance 50km from the nearest Czech-Slovak border crossing [13].

We focused on multithematic municipal associations because of wide range of activities. We selected 3 Czech (Obce pro Baťův kanál, Mikroregión Hustopečsko, Mikroregión Strážnicko) and 3 Slovak (Mikroregión Šaštínsko, Združenie obcí Viesky, ZMO Záhorie) multithematic municipal associations while there were randomly chose 5 municipalities of different size, who are their members. Respondents were divided into 2 groups: interviews with association management and association members.

Data were collected by questionnaire survey and telephone conversations. We create 2 separated categories- municipal associations (represented by association body) and association members- municipalities (represented by their mayor). We asked for formal information (year of origin, number of members, object of activity and system of funding), but also subjective attitudes connected with reaching the goals of associations. We asked for reasons of entering to association too.

We are aware of specifics of case study method, so we know it is not possible to generalize conclusions to all the Slovak or Czech associations.

**Table 1. Number of border municipal associations in examined regions (Source: Author)**

Type of association	Number of border associations in region	
	Trnava (SR)	Jihomoravský r. (CR)
multithematic	8	25
sewerage	4	13
waste, waste water	3	2
water conduit	3	5
pipeline	0	1
bike trail	0	1
spa	0	1
$\Sigma$	18	48

### 3 Results and discussion

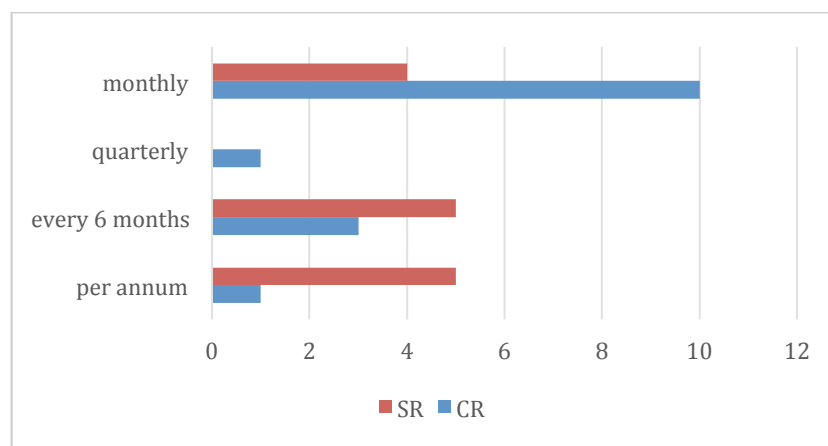
More than 73% municipalities said they are member of 2-3 micro-regional associations, almost 17% are member of 4 and more associations. According to the Register of Associations and charters of associations, all the examined associations are multithematic. Our survey shows that the most frequent object of activity is marketing and tourism, waste management and environment and preparation of development projects.

In Slovak and Czech associations, there is very similar organisational structure. The highest authority is created from all the member representatives (usually represented by mayor of the municipality). It makes decisions about fundamental issues of the association. Executive body is responsible for administrative and organizational agenda. Statutory body represents the association externally; it is usually chairperson or head. Control body is independent and control all the activities including economy, accounting etc. Especially Czech associations create function of manager, who is mainly responsible for running of the association. He/she is often a fixer who try to compromise.

There is no legislation especially on micro-regional association in Slovakia or voluntary municipal associations in Czech Republic. These associations are legislatively based on laws on municipalities, for example in Slovakia Law on municipal establishment, Law on regional development support, and Law on municipalities. Some municipalities are afraid of entering to these associations because of bureaucracy or not clear conditions. In Czech legislation, there is no definition of micro-region. Micro-region is understood as voluntary municipal association-DSO. In Slovakia, there is separately legislation of one form of municipal coordination- join municipal offices, but these are not multithematic and municipalities cooperate in the area of devoted competencies.

By Galvasová the periodicity of the meetings of members indirectly shows functionality of association. If its bodies meet only rarely (for example 2 times a year), its ability and effectiveness of cooperation will be lower than associations with regularly for example monthly meetings [7]. Members of Czech associations are more active and meet more regularly than Slovak (Figure 1).

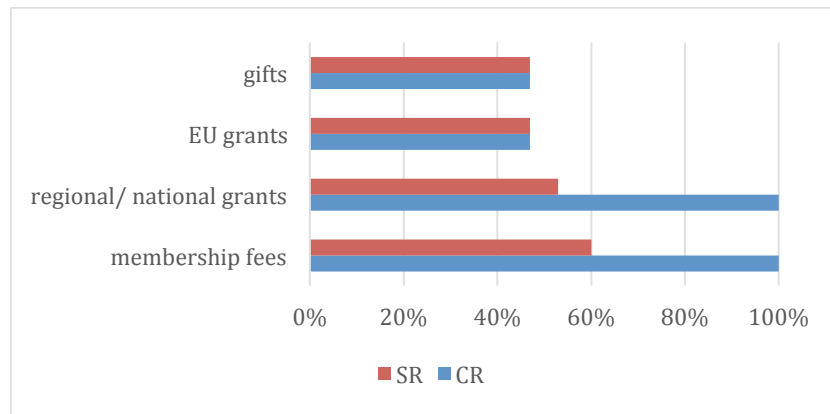
Figure 1. The periodicity of meetings of municipal members



By all the micro-regional associations their existence is legitimate, because they reach their goals (wholly or partly) why they were created. Partly reaching goals was justified by long-time property and financial settlement of land needed to infrastructure creation and the fact that fight for financial resources, needed to solving the problems, leads municipalities to competition more than to cooperation. Some of the mayors also miss higher support form state institutions that is not sufficient and it slack motivates to cooperation.

The most common form of funding is from own sources in the form of membership fees and using regional and national grant programs. Czech associations are more active in getting resources from national and regional programs. The half of associations, they use also grant programs from EU level and gifts (Figure 2).

**Figure 2. Forms of funding (by share of members who use it)**

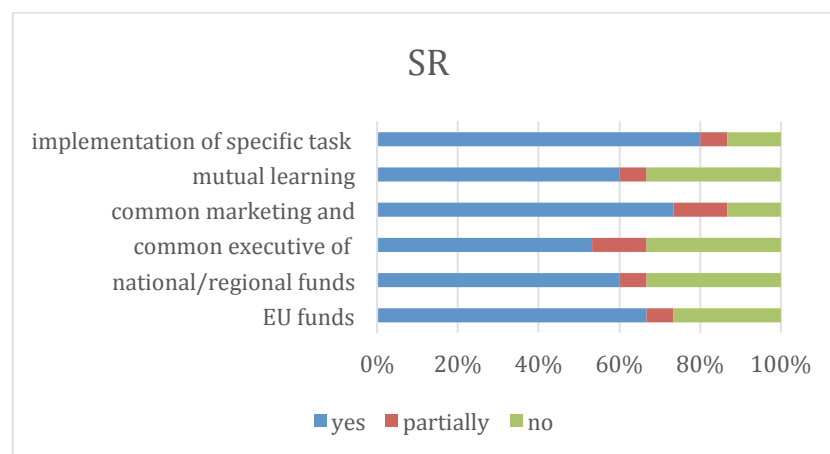


70% respondents said they use solidarity in reaching own sources (membership fee depends on number of inhabitants of municipality). 30% respondents (only Czech) said they use combined system of reaching own sources which include municipalities' share of benefits from realized projects.

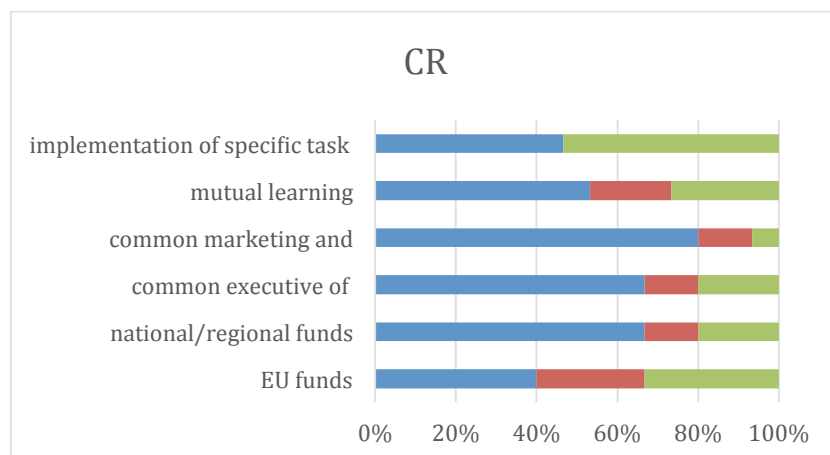
One of the important instrument of regional policy that associations may use is strategic planning. It consist of needs analysis and environment analysis, setting of goals with resources in form of strategic document, which determine micro-region routing. Strategic documents (mainly in Slovak associations) missing or are created very generally and do not accept specifics of concrete micro-region. None of three examined Slovak associations have its own strategic document.

The most common reason of municipality decision of coordination and creation of micro-regional association is common marketing and developement. Other reasons are drawing funds from national/ regional programmes and implementation of specific task or project (53% municipalities said this reason as most important or important). Drawing funds from EU and implementation of specific task were more frequented reasons in Slovakia than in Czech Republic. Czech municipalities more often mention common executive of competencies, common marketing, national, and regional funds (Figure 3 and 4).

**Figure 3. Reasons of municipality cooperation in Slovakia**



**Figure 4. Reason of municipality cooperation in Czech republic**



Only one responded municipality said that its expectations were not met. Other municipalities said fully or partially met of expectations. Czech municipalities are more satisfied than Slovak are. Reason of not fully meeting of expectations were insufficient activity and cooperation of association, staff composition or changes in area of drawing financial sources which limited planning project and activities (Figure 5).

**Figure 5. Met of municipalities' expectations**



The best advantages of membership in association were common organisation of events (70% of all responded), possibility to draw financial support from national and EU funds (67%) and mutual learning (63%). In Czech Republic, the best benefit is common organisation of events (80% from Czech municipalities). Slovak municipalities prefer mutual learning (73%) and more efficient service delivery.

The highest disadvantage is higher administrative burden and bureaucracy, needs of compromise and management that is more difficult. Czech municipalities also dislike insufficient promotion of common interests or missing strategic documents to drive its development.

Respondents said more benefits than disadvantages, in a ratio 2,5:1. One third of all municipalities do not know any disadvantages of membership in micro-regional association.

## 4 Conclusion

Legislation, object of activities, system of funding, benefits and disadvantages are very similar in both countries. Causes of their formation are mainly common implementation of activities, common development, marketing and drawing EU funds (in Slovakia) and common marketing, performing competencies and reaching national and regional subsidies (in Czech). In Czech micro-regions, there exists function of administrative-executive employee responsible for running of micro-region, its marketing and communication.

Slovak and Czech micro-regions both can use similar policy instruments including creating infrastructure, common marketing and creation and implementation of strategic documents, but in Slovakia, these documents often do not exist. In general, we can state that Czech micro-regions are more active than Slovak. They have their own websites with bylaw, organisational structure, contacts, strategic documents, budgets and internal directives. Czech micro-regions members meet more regularly than Slovak. In Slovak micro-regions websites there is problem to find out bylaw or budget and they are not willing to communicate with external environment.

All the members responded their membership met their expectations and gave them more advantages than disadvantages. Advantages are common organisation of events, application of funds, mutual learning, and better perform of services. They perceived only administrative burden and compromises in decision-making as disadvantages of membership in micro-region.

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