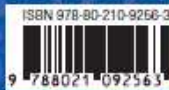Proceedings of the
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Current Trends in Public Sector Research
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CONTENTS

Prologue

It was a real pleasure to serve as the Head of the Programme Committee of the Current trends in Public Sector Research conference, which was held in Brno in January 2019. During last years the conference became one of the main floors for the debate of experts in public economics, the non-profit sector, and public administration.

The conference regularly hosts researchers involved in modeling public sector policies, evaluating their impact on public finance and social policy. The second group of researchers is usually devoted to public administration topics, such as responses to organizational changes, public sector leadership, or effectiveness of administrative services.

This year edition of the conference aimed to bridge the gap between these two main tracks of the conference. The main conference topic – the experimental and behavioral research in public administration – uniquely links theoretical research with public administration applications.

I am very happy that Professor Oliver James, University of Exeter (UK), accepted the invitation as a keynote speaker. Oliver James is a professor of political science and works on issues in public policy, public administration and regulation. His primary interest is in academic research and teaching. Moreover, he works with public sector organizations in the UK and elsewhere, and has acted as a consultant to bodies including the World Bank, OECD, UK Treasury, UK National Audit Office and UK Audit Commission. As his current research agenda covers applications of the method of laboratory and field experiment in public management, one can hardly find a better keynote for this year's conference topic.

It became a tradition that the main conference topic is reflected in the programme of the whole conference. It was a pleasure to arrange special conference session "Experiments in Public Management Research," which hosted researchers from the top European centers involved in laboratory and field experiments. The main conference topic was also discussed within other sessions, as can be seen from the papers included in conference proceedings.

The second special session, "Killing the Messenger? Civil society in the CEE countries" was oriented on another up-to-date discussion in the field. Mainly in the CEE countries a significant backlash initiated by new political representatives towards the third sector is visible. The panel, therefore, discussed the legitimacy of the third sector involvement in public policy, its picture in the society, and the role of media in shaping citizens´ attitudes.

As usual, the scope of the conference is broad and covers a variety of topics. The conference proceedings can serve as an overview of the current, highly discussed subject. Besides that, the reader is also able to see the scope of the analytical and research methods used in public sector research.

I am pleased that the conference proceedings contain mostly the contributions of doctoral students researching public sector. The quality of the analytical papers confirms that there is a great potential of the new generation of scholars involved in public economics and public administration research. This generation is in close connection with top researchers and is equipped with full access to resources in the field.

As this conference was the last for me in the role of the Head of the Programme Committee, I would like to thank all my colleagues who helped to keep this conference going. To give the scholars the floor to meet, discuss, and to dispute on their research agenda still symbolize the focus of academic life.

I wish Current Trends in Public Sector Research conference all the best in the future and looking forward to meeting you at its 24th edition in January 2020.

Jiří Špalek
Head of the Programme Committee

Bridging the Gap: Ghana's National Health Insurance Scheme and Its Impact on Under-Five Healthcare

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Abstract

Children under-five health care and well-being is critical to achieving the Sustainable Development Goals. An effective and sustained health system drives health care delivery and leverages effective healthcare outcomes, –particularly among mothers and under-five children. This study reviewed Ghana's health financing policy, the National Health Insurance Scheme (NHIS), and its consequent impact on early childhood (0-5 month) healthcare outcomes. Drawing upon qualitative fieldwork in Ghana, the study made use of semi-structural interviews with women within the reproductive age (15-50 years) from a diverse working background (including officials from the GHS and selected hospitals) in three selected study areas in the Western Region of Ghana. Institutional data from National Health Insurance Authority, World Bank, and Ghana Health Service were used to complement the interviews. The study revealed that though the national health insurance scheme is positively correlated with good childhood outcome, its implementation does not deliver on its intended purpose of closing the inequality gap in child healthcare. The study recommends that national health insurance coverage be expanded through a partnership with private medical insurance and service providers to enable pregnant women and nursing mothers have easy access to healthcare.

1   Introduction

Early childhood healthcare is one of the most prioritized topics in today's global health. Better child health improves human production, sustains future wages, and leverages growth and development of any economy. According to the report [15], about 5.4 million children die before their fifth birthday. Almost all of these deaths occur in developing countries, especially in sub-Sahara Africa (SSA), which contributes 50.1% of all the under-five death cases in 2017 [15]. Under-five mortality is distributed unequally across the globe. These deaths range from 123.3 per 1000 in Chad to 2.3 per 1000 in Finland [15]. These deaths are caused by preventable and treatable diseases [6], which means better health needs to be attained if these early childhood deaths are to be avoided. Health cost makes the poor poorer; therefore, world leaders are committing to 'health for all policy'. However, government's responsibility in the delivery of health services has an inextricable link to finance. Finance provides a boost to equality and universal health coverage.

Ghana is among the few countries in sub-Saharan Africa (SSA), which have national health insurance instituted as part of its pro-poor policies. The policy provides subsidies to augment the cost of health care through the expansion of healthcare access, affordability and maternal (antenatal and postnatal) user fee exemption policy. Indeed, the government's choice of the National Health Insurance Scheme (NHIS) was born out of the high rate of mortality in the country during the period ''cash and carry system''- a term used to describe financial setup where payment is made before one can access healthcare. This system led to a tragic outcome in the healthcare sector [14]. Also, the high-cost burden of healthcare on households, especially the poor due to the out-of-pocket payment for health services, underpinned the implementation of the NHIS. The scheme is funded based on the combination of tax, employer deduction and informal sector based on the capability of people [4]. The Free Maternal Healthcare (FMH)

programme, an aspect of the NHIS, ensures that all pregnant women irrespective of your economic status have free access to healthcare. However, the financial structure of Ghana's healthcare faces a critical challenge because of the over-dependence on donor funds and delay of the government to reimburse services providers.

It has been estimated that the National Health Insurance Authority and government expenditure on preventive and public healthcare was 29% out of the total expenditure, with 71% of the expenditure sourced from development partners (see: Health Sector Medium Term Development Plan report (HSMTDP II). The volatility and uncertainty of donor funds for the health sector pushes healthcare service to the brink, hence, reducing its ability to cater for key obstetrics and child health medication (e.g. Cytotec) and services [9]. This study reviews Ghana's pro-poor social healthcare financing policy – the National Health Insurance Scheme (NHIS) and its consequent impact on early childhood (under-five) health outcomes among the population. Through this lens, the study analysed the NHIS policy developments and its implementation to know whether or not it bridges the healthcare inequality gap among the populace as intended. It also discusses the maternal fee exemption policy under the NHIS, its impacts on early child health-related outcomes and how it influences household finance.

The main question addressed in this study is to what extent has the Ghana health insurance policy contributed to the under-five child health outcome? What has NHIS policy achieved so far in closing the inequality gap between the people (poor and the rich, urban and rural) as it intended?

1.1 Background of Ghana's Social Health Insurance

The government of Ghana's model of the social health insurance system has some elements of both Bismarck and Beveridge system [12]. In mid of the 1970s through to 1980s, World Bank and International Monetary Fund introduced Economic Recovery Programme, 1983, which led to the removal of the free health subsidies and enforced a higher fee on HFA (Hospital Fee Act) – Hospital fee regulation (L.I.1277). In 1992 the 'Cash and Carry' system was introduced. This policy deprived most of the population access to healthcare due to the high cost of service. The poor could not afford and were left to die home [10]. Children and pregnant women were the most hit [16]. The NHIS was then introduced through the Act of Parliament in 2003 to abolish the 'cash and carry' system.

Theoretically, the discussion on health insurance mostly centred on the effect of the coverage in general and how it influences the health-seeking behaviour among the population of a state. The rational decision - like let me try, I got nothing to lose - gave room for more women to visit the hospital before and during pregnancy then right after birth. NHIS induced a shift towards increase service utilisation [14]. Enrolment on the NHIS grew significantly with a total active registered member (both exemption and non-exemption) risen from 6.6 % to 38% in 2005 and 2013 respectively [11]. Those covered by the fee exemption policy only (most impoverished and elderly) of the NHIS rose from 54.5 % in 2010 to 63% in 2013. It shows that the insurance policy reached the targeted group. It is argued that Ghana's NHIS has an impact on the family income and this supposedly was in favour of the poor [12]. However, it is also noted that Ghana's pro-poor policy implementation process risk the poor since the change in relative cost, which is the back-born for the rollout of the health insurance may directly affect the poor [11].

1.2 Financing Flow of the NHIS

Operationally, financing flows into the National Health Insurance Fund (NHIF), created for the implementation of the national health insurance scheme, has six main sources. Act 650 and Act 852 of the NHIF defined by the Parliament of Ghana ensures the following categories for the mobilisation of the funds: (1) 2.5 % National Health Insurance Levy (NHIL) added on value-added tax (VAT) of selected goods and services; (2) A deduction of 2.5 % social security and Pension Scheme Fund from the formal sector workers managed by Social Security and National Insurance Trust (SSNIT); (3) Grants, donation, gifts and other voluntary contribution from

individuals, NGO's, multinational cooperation, international organisations and others; (4) The government of Ghana (GOG) annual budget allocation approved by parliament; (5) Money accumulated on the investment made by the surplus fund of NHIF; and (6) Premium/contribution fee pay by the informal sector to the NHIA.

Parliament may also from time to time allocate money to the NHIS. Effective under-five health care and development are dependent on finances that have been invested in health infrastructure and services [9]. From 2005, the proposition of GDP devoted to health was 6.4, since then GDP investment in health has ranged from 3% in 2010 till date [11]. Out of this, an estimate of 50% comes from annual budgetary allocation from the government, with the rest coming from donors. The percentage of Ghana's GDP allocated to health is insufficient compared to the 15% GDP that Abuja Declaration established.

Figure 1: Conceptual Framework of the Financial Flow
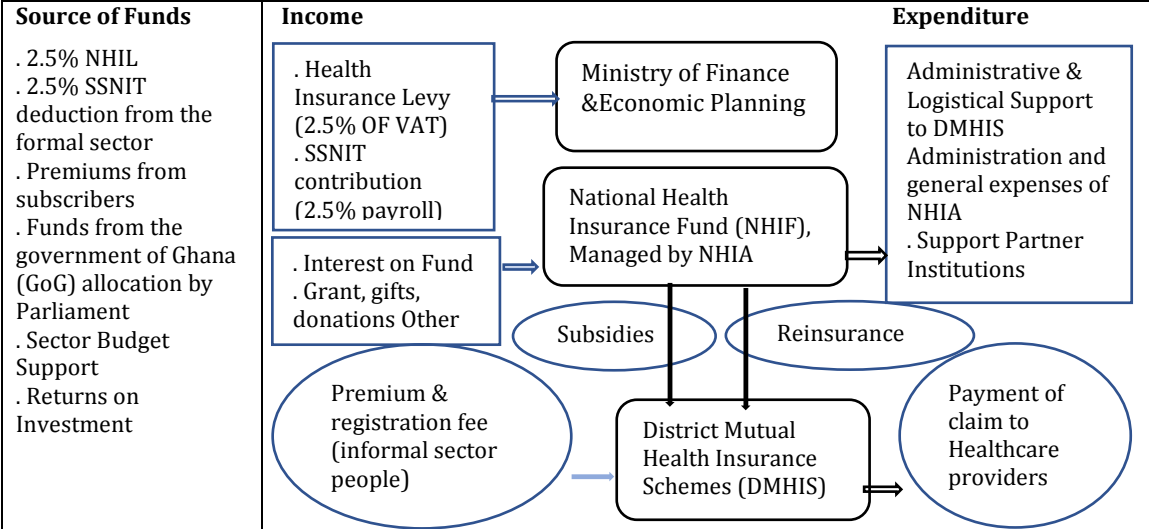
Source: Adapted from Asenso-Boadi & Agbeibor, 2010; Cited in [11] with a little adjustment.

2 Material and Methods

The research used both qualitative and quantitative data. Semi-structured interviews from March 2018 to October 2018 for the collection of data were employed. The interviews were conducted among women within the reproductive age as defined by the WHO (15-50). Respondents were all women within the reproductive age because one of the main vital components of the policy. Also, biologically women get pregnant and socially women have a greater responsibility as caretakers of babies in Ghana's family settings. Assessing the views of the targeted group on the NHIS policy was worth exploring. A total number of 200 women respondents in Takoradi, Mpohor and Shama all in the Western Region (WR) of Ghana were interviewed. These included informants from the institutional level to get the social, economic and political dimension of NHIS.

Case study areas were selected based on their location (20kms from Takoradi the capital city of the WR) and economic activities of the populace. Fifty (50) respondents from Mpohor, 50 respondents from Shama and 100 respondents from Sekondi-Takoradi were interviewed. This distribution was done to get the clear disparity of the NHIS impact in the urban and rural area. These communities are close to Takoradi yet under-developed in terms of infrastructure and services. Demographic information such as age, educational background, household size, type of employment and among others, which are essential indicators for assessing maternal and child health outcome as well as the NHIS policy usage and impact were collected. This data helped to examined whether the safe motherhood programmes under the NHIS are on target. Also, data

were employed as complementary from reputable organizations, such as GHS, WHO, UNICEF, WB, and AFDB.

3   Results and Discussion

A majority of women respondent were between the ages cohort 31-40 years representing 40 % of the total respondent. The other groups between the ages less than 20, 20 – 31 and 41 - 50 years, representing 20, 28 and 12% of total respondents, respectively. The result indicates that there were a high number of young women, which according to MOH have the highest level of fertility rate of 4.5%. Out of this number of respondents, 62 of them were without any formal education, 44 of them had primary education whereas 38 had junior high school and other 26 and 30 respondents had secondary and Tertiary education respectively (see Figure 2). The information on age and level of education was relevant because the level of knowledge and maturity of women have linked to the development of children, especially children under-five [15].

Figure 2: Age and level of education of respondents
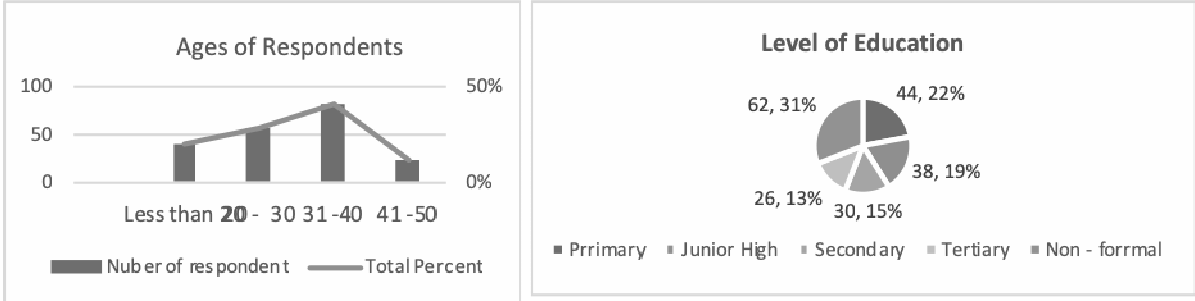
Source: Researchers own field survey, 2018.

3.1 The relationship between household size and economic activities of respondents

Study on the politics of Ghana's NHIS by [14] revealed that people nature of job influences their income, which subsequently have impact on their household health expenditure. Research shows that generally, household with heads who are farmers and mostly base in the rural areas are not just the poorest in Ghana, but they also contribute the most to Ghana's poverty [3]. According to [14] people with large household size are likely to enrol in the NHIS. This was true for the respondents who were farmers (fishing and crop farming) and have larger household size as well as lower level income but yet formed the largest registered NHIS members. The data in (table 1) shows details of the occupation of the respondents and the size of their household. 'Others' represented in table 1, means employment other than those analysed below. Also, the total number of the respondents in this section of the study was 78.5%, representing 157 respondents. 21.5% were not ready to disclose their job or family information.

Table 1: The relationship between household size and economic activities of respondents

Household Size	Farming		Trading		Salary workers		Others		Total	
Less than 6	15	7.5%	13	6.5%	25	12.5%	10	5.0%	63	31.5%
6-10	36	18.0%	28	14.0%	5	2.5%	8	4.0%	77	38.5%
11-20	7	3.5%	9	4.5%	0	0.0%	1	0.5%	17	8.5%
More than 20	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total	58	29.0%	50	25,0%	30	15.0%	19	9.5%	157	78.5%

Source: Researchers own field survey, 2018.

3.1.2 The effect of NHIS on health service utilization

Births attended by skilled personnel, antenatal and post-natal healthcare coverage, as well as cost, quality of treatment and time of accessing healthcare by pregnant and nursing mothers, are crucial for children under-five health [13]. These indicators (shown Table 2), are the critical determinant of under-five health outcome, since better maternal healthcare are inextricably linked with early childhood survival [18]. 102 respondents out of the 200 interviewed agreed to be NHIS card holders. Sixty-eight (68) respondents do not have any form of health insurance (both NHIS and private insurance) whiles 24 of the 200 respondents have Private Health Insurance (PHI). Of the 102 respondents, 98 women representing 96.1% agreed they utilised the institutional health service for primary healthcare (PC). Eighty-eight (88) representing 86% accessed perinatal and antenatal care, 69 delivered their babies in the health facility whereas 54 and 97 respondents obtained post-natal care delivery and had Prescriptions.

However, the same cannot be said for the women without NHIS or any form of health insurance, since few of them accessed the facilities as shown in table 2 below. Twenty-four (24) respondents with the private health insurance were mostly co-operated women, working for private and so call private government companies such as Ghana Port and Harbour Authority (GPHA), Osmose Energy Company etc. Almost all the 24 respondents have access to all the indicators defined for the analysis in table 2, except for post-natal care which had 16 out of the 24 respondents agreed to have utilised the service. The low turnout of the post-natal attendance for the private insurance cardholders was link to belief and culture, whereby the new-born babies were to be kept in the room for 7 days without the sun before bringing it out, unless under severe illness or attack most women obey this norm to avoid the supposed spiritual complication of it.

Table 2: The relationship between NHIS and utilisation of professional health care of respondents

Seeking Institutional Medical care	NHIS Cardholders		No NHIS Cardholder		Private HI cardholder		Total (200)	
	Freq	Percent	Freq	percent	Freq	Percent	Freq	%
Number respondents	102	51.0%	68	34.0%	24	12.0%	194	97.0%
Skilled health attendant for PC	98	96.1%	49	61.7%	24	100.0%	174	87.0%
Perinatal and ANC	88	86.3%	29	42.6%	24	100.0%	141	70.5%
Health facility Delivery	69	67.7%	32	47.0%	24	100.0%	125	62.5%
Post-natal care delivery	54	52.9%	14	20.5%	16	66.7%	86	42.0%
Prescriptions	97	95.0%	48	70.6%	24	100.0%	169	84.5%

Source: Researchers own field survey, 2018.

3.2 Analysis of inequalities of health care between urban and rural areas in Ghana

The accessibility and delivery of effective health care is linked to the distance of users to health facilities and infrastructure, availability health professional and the cost of treatment. However, the health situation in Ghana has been characterised by significant inequality over the past years [4]. Even though the state is the leading provider of healthcare for 70% of the population due to the NHIS, private sectors facilities ownership accounted for 46.4% of the 336 number of the general hospitals in the country. Also, the private sector is dominant in providing maternity home, which stood at 379 out of 389 representing 97.4 % of the overall maternity homes in Ghana [1]. Almost all of them are located in cities and big towns. Private sector healthcare services are costly due to the high standard of services delivery; therefore, most poor people could not afford [6]. One of the reasons that prompted 'health to all policy' is the health inequality among the populations as a result of geographical accessibility. Accessing health service remains poor in some part of the country, mainly the rural areas and notably, the northern part of the country. The inequality in accessing health services between urban and rural dwellers is enormous. The data analysed by [10] revealed under-five mortality (deaths per 1,000 live births) was 90% in rural areas and 75% in urban places of Ghana in 2008. The inequality in the number of deaths between the rural and urban reflected the poor socio-

economic status of the population living in the rural, as many poorest people live in these areas (see table 3).

Yes, I have the NHIS card, but there is no hospital or clinic anywhere close to my village, the nearest health post is at Mpohor, we hardly meet a midwife or a doctor... My husband has to put me in a taxi to travel a distance to get a better hospital in Takoradi. Last year two of my friends in my village lost their babies and one died with the baby. I am scared, so any time I am about to give birth my husband brings me to live with his sister here in Takoradi .... so that I can get access to a doctor when I am in labour. – [Kukuwa, a house wife from Ayiem].

Though people have the NHIS card which gives the right to utilise the public health services as well as some private providers, it did not necessarily close the gap or ensure equality in health serves delivery. The availability of the service was skewed to the urban area where most of the improved population lives. The human resources and the facilities according to some respondents were not available. The inequality in the distribution of health personnel is vast as well. As of, 2012 ending, twenty-five government general hospitals out 93 in Ghana were without a doctor, eight (8) out of the 25 were located in the northern region alone [4]. Greater Accra region which is urban and the capital city of Ghana accounts for 50 % of all Ghana's doctors, with one doctor to 3.540 dwellers, the other 20% are for Ashanti Region. The Upper West region has 11 times fewer doctors than the Greater Accra region [10]. The same pattern of unequal distribution of midwives could be seen in Figure 3. The analysis (figure3) shows an evident inequality across Ghana's health sector. The WR as of 2012 has 277 midwives as compared to Greater Accra (GAR) which had 812. The disparity in allocation of HRH may have significantly contributed to the high number of mortalities of the under-five children in some part of the country.

Most expectant mothers who are rushed in here from nearby villages have registered NHIS card, but they come without any basic baby kind of stuffs on them. After delivery, any item you ask them to buy becomes a problem. The husband or relative who brought her will tell you he/she used the last money on him to pay for the taxi or vehicle that commuted them to the facility. We sometimes had to support them from our own resources, but it is becoming unbearable for us too.... [Mrs. Asare a midwife working at Effia-nkwanta regional hospital, June 2018].

This goes to confirm the argument that NHIS may have increased the number of women who seek for institutional health but have not necessarily close the inequality gaps among the population [14]. This study agrees with other findings, which indicate a vast disparity of the under-five mortality within countries, between the rich and the poor household especially those living in the rural area [5, 17]. People residing in rural areas do not only spend on the health service but also transport, feeding and housing cost in the process of trying to get better health services in the cites. Hence, an effective health goes beyond the health sector but includes other dimensions of the economy.

Table 3: Inequalities of health care between urban and rural areas in Ghana 1n 2008

Indicator	Rural	Urban	Poorest 20%	Wealthiest 20%
Under-five mortality rate (per 1,000 live births)	90	75	102	60
Births attended by skilled health personnel	43	84	24	95
DTP3 Immunisation (1-year-olds)	91	87	89	93

Source: Adopted data from MoH, 2015.

Figure 3: Trend of Ghana's Doctors and Nurses distribution in 2016; Mid-Wives' distribution for 2011-2014.
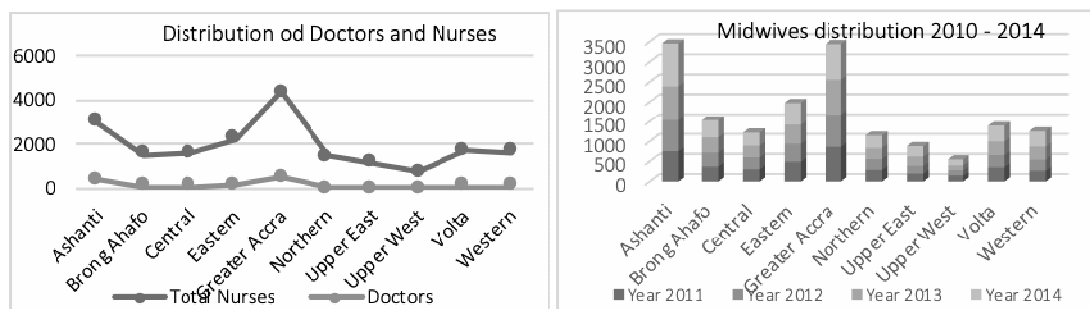
Source: Data from GHS, 2015, Ghana Statistical Service- GDHS, 2016.

3.3 Discussion

An understanding of the state of NHIS in Ghana was a meaningful way to reveal how the state intervention policies, programmes and practices can be aligned to promote better health for all.. Early child mortality has reduced significantly across the country since the introduction of the NHIS in 2005.

The ratio of neonatal morality reduced from 33.4 per 1000 live birth in mid-2005 to 24.4 per 1000 live delivery in mid-2017, whiles under-five mortality per 1000 live birth reduced from 85.7 to in mid-2005 to 49.3 in mid of 2017. Infant mortality remains the same without an additional death, 3.8 death per 1000 live birth from mid-2005 to mid-2017 [15]. Operationally, the NHIS has a mixed perspective, the progress and the challenges. The quality of service has improved, due to NHIS accreditation insisted for all providers to prove level of quality using an outlined institutional quality assessment rules before issued with the NHIS licenses to provide services [15]. As seen in the field survey (table 2), similar trend in the number of birth cases attended by skilled professional as of 2014 stood at 74% a significant improvement from 59% in 2003. Birth cases in health facilities, rising from 57% in 2003 to 73% in 2014 (see [14]). However, this improvement has been observed (section 3.2) to be unequally distributed across the country. As children in rural areas and from poor households, an example in the northern regions are more prompt to diseases and died before their fifth birthday than those living in Accra, urban. Also, there are implementation challenges of the NHIS. The researcher observed poor supervision and monitoring of the policy implementation. Indeed, it has been argued that NHIS is not well supervised and organised due to the centralised system of the NHIA decision-making process and the high political parties' interference [9], [14]. These implicate reimbursement of the service fee to providers.

I was in the hospital, but they asked me to pay some money even though I have the NHIS card, so I have decided not to go again as I don't have the financial resources....... [Mrs, Koomson, a Fish seller at Shama Taxi station, August 2018].

It was also revealed from the field survey that some registered NHIS members can access healthcare, but NHIS policy intended to ensure the poor get equal access to quality and affordable healthcare was not wholly accurate. There were no health facilities in most of the rural areas visited, in the places where there were health facilities, they were under-equipped. Some women end up losing their babies or their lives during the journey to seek professional care. More efforts should be put in the policy implementation process. There should be more education and health promotion on the need for post-natal healthcare. Programs that focus on gender should be strengthened to empower women to be financially independent to able to access better health care alternative to reduce the gap.

Moving forward, since financial incentive prompt implementers (both private individuals and public authorities) to behave certain way desire for the realisation of policy. It is crucial for every nation mostly developing country, particularly Ghana policy decision makers and implementer to mobilised enough financial resources through private-public partnership, and outsourcing to implement this intervention (free maternal Health Care and fee exemption policy for children). Risen and allocation of financial resources do not only improve the distribution of

policies, but it also helps regulatory or constitutive of programs or other interventions [8]. 'Primary healthcare for all' (Alma-Ata declaration) is still a very significant rule to follow by the policy implementers.

3.4 Limitation

The study did not include men in the field survey, even though fathers play an essential role as the head of the family in Ghana. It is, therefore, necessary for future research to consider the role of males as a critical determinant of under-five mortality in Ghana and other parts of the world. Also, most women were not cooperative, and especially those the researchers met at the maternity wards of different hospitals. Health providers were also not ready to answer some questions.

4   Conclusion

This study presents selected examples of the state of inequality in Ghana, highlighting essential and relevant stories of the state of RMNCH (reproductive, maternal, new-born and child health) programes. It analysed the impact of Ghana's social Insurance on under-five health outcome. It was shown that women registered with the NHIS are likely to seek primary health services as well as access professional skilled health service as compared to those without any form of insurance. Indeed, the NHIS has positively impacted under-five health outcome, since effective access to health care during pregnancy and after birth is linked to the baby's under-five survival and children development in general. However, health care delivery improves in urban but deteriorates in the rural areas. This trend is further driven by the poverty distribution, where there are more poorer mothers living in rural areas than urban areas. More poor and rural population is likely to pay more to access health care due to the poor and unequal distribution of health resources in the health system. The NHIS policy needs to be reformed to ensure that the rural and the sparse population have a fair share of the national health care system [8].

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Industrial Cooperation, Knowledge Sources and the Role of Public Sector in Manufacturing Firms: Case of Spain and Portugal

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Abstract

Public Funding for firms has been argued as a catalyst for firms' cooperative and knowledge generative activities in contemporary knowledge-based economies. As innovation potential is widely poised as regional competitive ability, firms' cooperation with partners have been revered as a preliminary activity to establishing networks whilst sharing diverse knowledge from partners involved to initiate or even mediate innovation. Using data from Community Innovation Survey (2012-2014) and SEM analysis on Spanish and Portuguese manufacturing firms, the paper assesses the relevance of public funds on cooperation tendencies of firms, knowledge sourcing from partners and eventually, the moderator role played by cooperation in appropriating public funds for knowledge acquisition. It was found that public funding significantly influences cooperation in Spain than in Portugal whilst cooperation was much more influential in sourcing for knowledge from partners in Portugal than in Spain. Results also revealed a slightly higher moderator ability of cooperation in Spain than in Portugal. Country-specific recommendations were further created.

Keywords: Public funds, Cooperation, Knowledge, Spain, Portugal.

JEL classification: O32, O38, O52

1 Introduction

The early 20th century witnessed the strong adoption of public support and interference in private economic activities of macro and micro regions. Emergence of the new growth theory also further entrenched government's interest in supporting and actively engaging in regional growth efforts by actively supporting firms via subsidies and grants. Adoption of the open innovation model not only limited firms to the assistance of governments but also incited an interactive and knowledge sharing collaborations which opened up firms up to new margins of innovation now strongly endorsed as a model for contemporary regional growth.

Literature on cooperation of firms with universities and research centers have been endorsed by most researchers [3], clients [14], [19], and suppliers [2],[12] and have proven to be viable partners for knowledge generation and acquisition. In Spain, cooperation measures has been realized by entrepreneurs as having one of the lowest cooperation intensity in the Union, decreasing rapidly from 2012 forward whilst Portugal, from the viewpoint of Universities and businesses was adjudged to have a weak cooperation as well [28].

Majority of research have also endorsed the overwhelming relevance of cooperation by firms [7],[33],[30] knowledge sourced for innovatory needs [7],[29],[33]. Despite the contrary propositions that public funds are mere interferences in the economy and stifles businesses by crowding out funds [1], the researcher believes that funds invested for research are equally beneficial as privately invested funds and supports the notion cooperation as both an antecedent and a transformer of resources invested for research collaboration and knowledge generated.

Owing to the new-found public support for innovation centric activities [4],[23], the below par cooperation levels in Southern European countries [28], the need for cooperation in creating intellectual capital for expediting regional knowledge growth and competitive advantage [22] and also the continuing contemporary public financial interest in supporting knowledge sharing, the research aims to assess the relevance of public funding on cooperation, on knowledge

acquired and the moderator role cooperation plays in transforming public funds into knowledge acquired by firms for innovation needs.

The first section of the paper will give an introductory review of the topic focused, the second part will discuss the literature on the concept of funding, cooperation and knowledge, the third part will explain the methodology used and the data sources, followed by analysis of the results and finally conclusion.

2 Literature Review

The New growth theory has incited international and national support for knowledge sharing and co-operative interactions with firms, academic institutions and industrial partners and even non- governmental organisations (NGO's). Owing to the regional value created and its innovation potential, supranational, national and local authorities in recent times, increasingly inject public funds into firms' operational and cooperative interactions with other firms, academic institutions, research institutes, suppliers etc. with the eventual objective of firm growth, innovation and subsequent regional development [22].

The circular triple helix model buttresses this adopted responsibility of the government as a financier via establishment of funding programs and subsidies to support industrial collaborative research with Universities, other firms and other relevant partners in the industrial and market sphere [13]. Such financial support expended to regional players is fundamentally oriented at inter-firm R&D collaborations, firms and academic collaboration as well as other external partners. Strategic alliances created by firms in lieu of this resource acquisition has its tenets on accessing new resources, acquiring access to new technology to innovate or to penetrate new and uncharted markets [25].

Spike in publicly funded collaborations in industries in recent times have been alluded to additional funds for innovation required within the industrial sphere owing to the adjudged inefficient use of the public funds invested for cooperative research among other partners in the industrial sphere [17]. Previous research also found that federal R&D stimulates total private R&D intensity [6] whilst, it had been thought that private R&D investment devoted to research falls as the firm receives more public R&D funds. It was however, argued to have been caused by crowding out but it was rebutted that such funds were only an aspect of the entire company budget [1] and hence could not be argued that federal funds significantly diminished expenditure of private firms.

Reliably, such funds expended are ridden on for cooperation by firms with other firms [24] and Universities. Research in the public sector have revealed the significance of public support on the tendency of companies undertaking R&D cooperation with public research organisations all of which are aimed at eliminating market failures, [22]. Despite the wide acclaim that public funds supports firm research, some authors denounce the relevance of public funds to research and development activities of firms as it is believed to be strongly dictated by firms internally generate funds rather than public investment further entrenching the contrary [4] which could be chiefly aligned with perceived bureaucracy at the National and supranational level as well as implementation and transparency inefficiencies.

Cooperation with industrial partners incites sharing of knowledge from all participants effectively perpetrating the lasting effects of knowledge spill-overs from academic sector the industry and its partners. Regional growth in a knowledge-based economy, in contemporary times, have been hinged on the how easy knowledge is acquired, shared and used for innovatory purposes [2] to harness entrepreneurial opportunities and acquire greater recognition for leveraging. [23] undertook a case study research to assess how funding agencies assisted in generating knowledge that spans various disciplines. In their cases studied, they concluded funding needs to be flexible, to allow programmes the time and space to evolve and realise their full interdisciplinary potential. This funding also needs to include investment in liaison roles and less visible processes.

Czarnitzki et al. [9] applied a matching estimator in a multiple treatment setting, analyse the effects of R&D collaboration and public R&D funding on R&D per sales and patent acquired for Germany and Finland and found that collaboration has positive effects. [8] entrenched the connection between funds and knowledge of firms on a study of how sources of funds and diversity of knowledge affected firms' new product development. They found that internally generated funds emboldened the impact of R&D sources with more diversity of knowledge on the sale of new products, while external funds strengthened the effect of R&D sources with more control of knowledge on the sale of new products.

Literatures on strategy have also revealed that cooperation and knowledge acquired from external agents are relevant resources of the firm in the current competitive environment, especially for innovatory reasons [11]. As it has been touted as "open innovation model", firms have been encouraged to establish networks and relationships with other agents of the innovation system such as customers, research institutes, Universities and others to complement their resources and internal capacities with outside ideas [21], [10].

Sánchez-González et al. [27] assessed cooperation with customers and how it affected firms' innovation tendencies. Using knowledge generated to represent innovation, they found that firms cooperating with customers induced firm to increase investments oriented towards expanding the technological knowledge base within the firm's technological domain effectively reducing their technological investments. Consequently, they found that this cooperation had directs effects on firms' economic returns engineered from the sales of new products new for the market endowing firms with continued competitive edge. This was concurred by [15], [32].

Based on the above discussed literature, which endorses both the relevance of public funding to cooperation of firms [17] even as there are some rejections [4], the author is of the notion that funding for industries does support and eases the expenditure set aside for innovation by firms even as cooperation is believed to generate knowledge for firms quest for a strong competitive advantage and innovation. On this note it is hypothesised that "Public funds invested are significant indicators for stimulating cooperation with industrial partners-competitors and suppliers"-H1.

Having known the theoretical support and rejection for public funds on cooperation and cooperation on knowledge [27], which has been represented as knowledge by some authors, some results of cooperation in research on knowledge have been held as quite uncertain [18]. The open innovation model equally stresses the significant effect of collaboration with other partners of the firm on the knowledge generated and innovation tendencies of firms [22] hence, second hypothesis [H2] is created such that "Firms' cooperation with other industrial partners-competitors and suppliers- is significant to knowledge acquired for innovation"-H2.

Upon the creation of the previous hypothesis, and the literature on impact of collaboration on knowledge sourcing [27], [18], essence of knowledge acquired], it is further hypothesised that "Public funding of firms significantly affects the sourcing of knowledge for innovatory needs"- H3 whilst "Cooperation as a variable is a significant moderator to knowledge sourced upon investment of public funds"-H4. The goal of the paper, however, is to reveal the essence of public influence on cooperation and knowledge sourcing and establish the moderator role played by co-operation in effectively utilising public funds for acquisition of knowledge by firms.

3 Data and Methodology

Data from Community Innovation Survey (2012-2014) was resorted to for this analysis. CIS data represents a survey designed to reveal information on the sectoral innovation activities by the enterprises involved, activities undertaken, the funding sources and the inherent location of such firms. This questionnaire was utilised for the purpose of the research as used by [30] and [11]. The data focused on 15,777 local, national and EU headquartered manufacturing firms in both Spain and Portugal with a real Gross Domestic Product per capita (PPP) of €24500 and €11,800 respectively as of 2017 as reported by the European Commission. Research and Development intensity has largely been shown to affect cooperation in contemporary times

These countries were selected because of their reported below-par cooperation intensity levels in with Universities and industries [28] and innovation performance in recent years despite their glowing potential reported by [30] and European Commission as of 2017. It is even imperative because of the strong need for cooperation and research and development intensity required in generating intellectual capital to expedite regional growth.

Despite the argued philosophical bias and supposedly weak external validity preached by critics, to reveal the moderator role, the study resorted to the use of Structural Equation Modelling (SEM) analysis to develop a model to analyse, test and confirm the above-stated hypothesis. This model was selected due to its assumptions of free distribution, its analytical capability of revealing moderating and mediatory roles and its compound of analytical tools that suited this analysis [20] as well as its capacity to general compute models in a multiple regression.

Figure 1: SEM structure for both Portugal and Spain
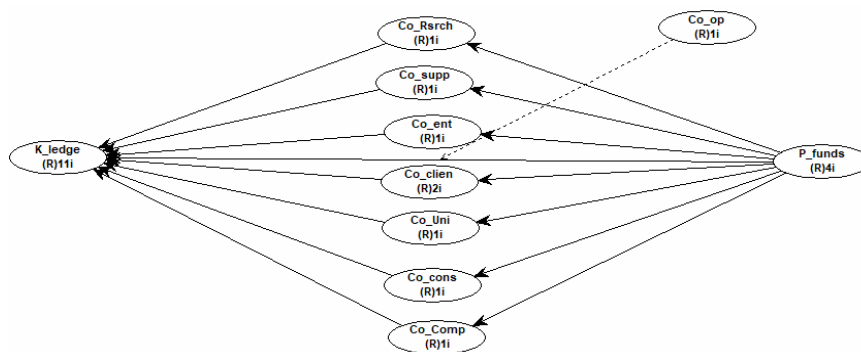
Source: Authors' own formation.

Table 1: Reliability and internal consistency tests [first part]

	P_Funds		Knowledge		Co_ent		Co_Supp		Co_Client		Co_Com	
	Spa	Por	Spa	Por	Spa	Por	Spa	Por	Spa	Por	Spa	Por
Composite Reliability	0.8	0.6	1	0.9	1	1	1	1	0.8	0.7	1	1
Cronbach alpha	0.6	0.2	0.9	0.9	1	1	1	1	0.5	0.4	1	1
Average Variance extracted [AVE]	0.5	0.3	0.6	0.4	1	1	1	1	0.7	0.6	1	1
Full Collinearity VIF	3.1	1.2	1.6	1.2	1	1	1.6	1	1.4	1.2	1.3	1.2

Source: Author's own.

Table 2: Reliability and internal consistency tests [second part]

	Co_Rsrch		Co_Uni		Co_op		Co_Cons		Co_op*P	
	Spa	Por	Spa	Por	Spa	Por	Spa	Por	Spa	Por
Composite Reliability	1	1	1	1	1	1	1	1	0.8	0.6
Cronbach alpha	1	1	1	1	1	1	1	1	0.6	0.2
Average variance extracted [AVE]	1	1	1	1	1	1	1	1	0.5	0.3
Full Collinearity VIF	1.9	1.3	1.6	1.2	2.8	1.2	1.5	1.2	3.1	1.2

Variables used: P_funds: Local, National, European Union funds and Funding from EU's 7th Framework Programme for RTD; Co_ent- Cooperation with other enterprises within enterprise group; Co_Supp- Cooperation with Suppliers of equipment; Co-Clie- Cooperation with clients or customers from the private sector and the public sector; Co_comp- Cooperation with competitors or other enterprises; Co_cons- Cooperation with consultants and commercial labs; Co_Uni- Cooperation with Universities; Co_Rsrch- Cooperation with Government, public or private research institutes; Co_op- Co-operation arrangements or innovation activities. Knowledge- knowledge sourced from within the enterprise or enterprise group, suppliers of equipment, materials, components, or software, clients or customers from the private sector, clients or customers from the public sector, competitors or other enterprises in your industry, consultants and commercial labs, universities or other higher education institutions, government, public or private research institutes, conferences, trade fairs, exhibitions, scientific journals and trade/technical publications, professional and industry associations. Spa- Spain, Port- Portugal.

4 Results and Analysis

To establish the fitness, reliability and the internal consistency of the model and the, validation analysis was carried out composing of discriminant validity, composite reliability and Cronbach alpha for the test of construct validity. To measure error and composite weights, the construct reliability uses the Cronbach's alpha coefficient for estimation. A Cronbach's alpha with the value of equal to or greater than 0.7 is acceptable [16]. Convergent validity, the extent to which the measurement items together explain the construct they represent in the structural model [16] is assessed with Average Variance Extracted (AVE) and composite reliability (CR) using a minimum loading of 0.50 and maximum of 0.70 respectively [16, 20]. The model however, satisfied all these conditions.

Table 3: Estimates and test of Hypothesis

	Hypothesis	Beta (P-value)		Result		Hypothesis	Beta (P-value)		Result
		Spain	Portugal				Spain	Portugal	
H1a	P_funds–Co_Supp	0.23 (0.0)***	0.04 (0.0)***	Accepted	H2a	Co_Sup-Knowledge	0.10 (0.0)***	0.42 (0.0)***	Accepted
H1b	P_funds-Co_comp	0.18 (0.0)***	0.05 (0.0)***	Accepted	H2b	Co_comp-knowledge	0.04 (0.0)***	0.09 (0.0)***	Accepted
H3	P_funds-Knowledge	0.33 (0.0)***	0.20 (0.0)***	Accepted	H4	P_funds–Co_op-Knowledge	0.07 (0.0)***	0.05 (0.0)***	Accepted

Source: Authors' calculation.
*Legend: * Significant at p<0.10, **Significant at p< 0.05, ***Significant at p> 0.01*

From table 3, it could be observed that in both Spain and Portugal, public funding is recognised as a significant influencer of cooperation among all partners of firms in the industry. However, it could be observed that the degree to which public funds affects firm's cooperation with industrial partners (both with suppliers and competitors) was higher in Spain than in Portugal. This implies that Portugal relies more on public support in intensifying their cooperation centres initiatives with competitors and suppliers than required in Spain. This could be held as a preference for potential usage of business expenditure in cooperation initiatives or an over-reliance on public support by Portugal which could also be an indication of market failure[22]. This effectively accepts H1 concurring the work of [24].

Furthermore, the significance of cooperation of selected industrial partners on knowledge acquisition of firms was also found significant among all industrial partners considered-suppliers, research centres, Universities, consultants and laboratories, competitors and other firms within the same industry for both countries. This points out a very salient source of information generation in the Manufacturing sector inadvertently highlighting the pillars that could generate competitive advantage in an intellectual sense in Portugal and Spain even though is comparatively less potent in Spain. It is even more imperative as intellectual capital has been a significant driver of regional growth and global competitive strength in the knowledge economy This effectively accepted H2 in both Spain and Portugal concurring to findings of research with similar variables [14], [19].

In table 3, public funding was also found to significantly impact the sourcing of knowledge for innovatory needs in both Spain and Portugal thereon accepting the above stated H3. This research closely affirms the research of [26]. Furthermore, cooperation as a moderator of the relationship between public funding of firms and knowledge sourced by firms for innovation was found to be significant as well for both countries considered as well, however, the beta coefficient of 0.07 for Spain and 0.05 for Portugal evidenced a much effective role of cooperation in metamorphosing public funds for knowledge generation in Spain than in Portugal even though it very low in significance. These results also accepted H4 stated above and research direction of [5].

5 Conclusions

The study set out to reveal the impact of public funds on cooperation and knowledge, cooperation with industrial partners on knowledge generation and how cooperation moderated the transformation of such funds in to knowledge acquired by firms for innovatory purposes. H1 was accepted in both Spain and Portugal affirming the relevance of public funds in cooperation with industrial partners in the Manufacturing industry of both countries. However, the weights of the impact were higher in Portugal than in Spain. It is recommended that appropriate measures of transparency and control are duly endorsed to follow up on the usage vs results comparison of the funds provided to firms in Spain owing the direct relevance of funding.

H2 was also accepted confirming the significance of cooperation with industrial partners on knowledge acquired by firms for innovatory needs. Cooperation with industrial partners has much higher significance on knowledge acquisition in Portugal than in Spain. Owing to the overwhelming evidence of research of cooperation on knowledge generated for innovation, it is recommended that a deeper focused is placed on expediting and intensifying connections among firms via for example, public science and technology events, to appropriate the maximum returns of cooperation. H3 was accepted in both Spain and Portugal even as it was found more relevant in Spain that in Portugal. This entrenched the relevance of connection between public funding and knowledge acquired by firms for innovation. It is however recommended that firms engage active ex ante measures to control for the usage and proper assignment of funds to assigned knowledge generation sources. Ex post control measures is also recommended to be pursued to ensure an even more direct relevance and efficient use of funds for knowledge engaging activities. Lastly, H4 was also accepted as cooperation was assessed and found as a significant moderator of public funding and knowledge acquired by firms for generating product and process innovations in both countries. Firms in Portugal are recommended to attach higher importance to the taxpayers' fund and engage actively in cooperation and explore more platforms for engagement to intensify cooperation within industries to even higher effects whilst the Government and supranational bodies are equally admonished to eliminate red tapes to financing and even create wider platforms for access to finance whilst supplementing it with active ex post control measures and redirect funds in line with need and significance to the sectors in need. Further research could use a panel data to cover a wider range and also provide a gap period for input variables to transform into the selected output variables.

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Organizational-legal Form of Czech Hospitals – Analysis of the 2006 ´Window of Opportunities´

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Abstract

A key feature of Czech health care reform after 1989 was the principle of de-monopolization and decentralization. At the same time, the health care reforms focused on the privatization of health care facilities and health care providers. Therefore, the paper deals with the efforts to change the organizational-legal status of hospitals after 2000, i.e. after a reform of the state administration occurred. The paper uses the multiple streams framework to describe successful process in giving a legislative anchor to the new organizational-legal form of hospitals and to identify the most important policy entrepreneurs. It maps all three streams (policy, politics and problem streams) and uses a broader concept including agenda setting as well as decision-making process. A policy window opened and allowed a policy change in 2006 when 245/2006 Coll., on Public Non-Profit Institutional Medical Facilities passed. The research adopted a single-case study design. Data were obtained through document analysis (law proposals, resolutions of Constitutional Court, stenographic records, strategic documents etc.). Examined period covered years 2002 – 2006. Findings confirmed the assumption that all three streams play a role for agenda coupling while in case of a decision coupling, the political stream is the most important.

Keywords: multiple streams framework, hospitals, health care system

JEL Classification: H41, I12, I18

1 Introduction

Health systems have had to cope with many changes of socio-economic and political environment such as pressures to contain costs, changes within the welfare state [7, 26]., and globalization processes [11, 35]. The development of the Czech health care policy after 1989 corresponded to the development in the region of Central and Eastern Europe that experienced a major transformation of health care as a consequence of society-wide changes [33]. The original Semashko model (the concept of health care according to the model of the USSR see, for example [27]) allowing the socialist state to legally and in fact dominate healthcare [31] has become the subject of transformation. Its aim was to end the centralized organization of Soviet-type health services and to reorient towards the Bismarck model [23]. A key feature of Czech health care reform after 1989 was the principle of de-monopolization and decentralization. At the same time, the health care reforms focused on the privatization of health care facilities and health care providers [4]. The Czech health policy became the arena of disputes between the advocates of maximum use of market principles in the health sector and the advocates of a concept of health services as public services. [19]

The contribution concentrates on efforts to change the organisational-legal status of hospitals after 2000 when a reform of the Czech state administration occurred. There were several attempts to change the organisational-legal structure of hospitals but only one of them led to the successful approval of Act, namely Act No. 245/2006 Coll. on Public Non-Profit Institutional Health Facilities. This law was abolished after five years with the justification that in those five years of its validity the norm had never been used. Yet, it was the only agenda setting that led to a finished decision-making process. The aim of the contribution is to explain successful process in giving a legislative anchor to the new organisational-legal form of hospitals

and to identify the most important policy entrepreneurs. The paper demonstrates the use of the multiple streams framework for the case of health policy in the Czech Republic.

1.1 The Multiple Stream Framework

There exist different approaches to analyse agenda setting and policy change. Concerning the topic of the successful policy change we may consider the advocacy coalition framework, the punctuated equilibrium models or multiple streams framework. The advocacy coalition framework focuses on competing coalitions which compete for their position within the system and in the same time they revise their strategic positions. [32] The coalition itself is consistent due to the "belief system" (for more details see [32]). The advocacy coalition framework suits better to explaining policy stability than policy change. It also has problems to explain temporary alliances that are based on self-interest and eliminate core beliefs. [7] The punctuated equilibrium model [2] is based on presumption of long period of policy stability which are punctuated by short intense periods of change. Those periods give actor the possibility to use new ways to frame and solve policy problems. In consequence of the limited resources the actors are not available to deal the full range of ideas and policy problems and they tend to promote just small number of them. In their original approach the author didn't consider the role of political parties and also the limited universality of the model was criticized. [8]

The multiple stream framework (MSF) is more complex in comparison with the previous two. MSF was originally developed by John Kingdon to explain how different streams (policy, politics and problem streams) couple and open a policy window that allows a policy change. [22] Kingdon's MSF, published in Agendas, alternatives and public policies (1984), is considered as one of the significant contributions to public policy research [5], particularly in the field of agenda setting. Kingdon used his theory to explain the functionality of the federal-level policy making process of the United States. His explanation of the federal-level agenda in the US is based on three categories of independent, albeit somewhat interconnected, variables whose interactions can lead to a "window of opportunity" for the agenda setting.

While being a theory of agenda setting in the US, Kingdon's theory has been also applied to implementation processes [1, 18, 21, 25, 36]. Following authors have often applied MSF to other levels of public policy in different countries and across a range of fields from health, education, legislation to e.g. telecommunications or energy policy [10, 16, 20, 28, 30]. Oftentimes, the authors agree that the expansion of the studied areas requires adaptation of the MSF as it is applied to a different area than was originally intended by Kingdon [1, 16, 18, 21, 25, 36]. The contribution uses modified MSF which broadens the concept by including agenda setting as well as decision-making process (for more see [16]:36). In decision-making process, the three streams coupe again but the decision window of opportunity usually opens within political stream.
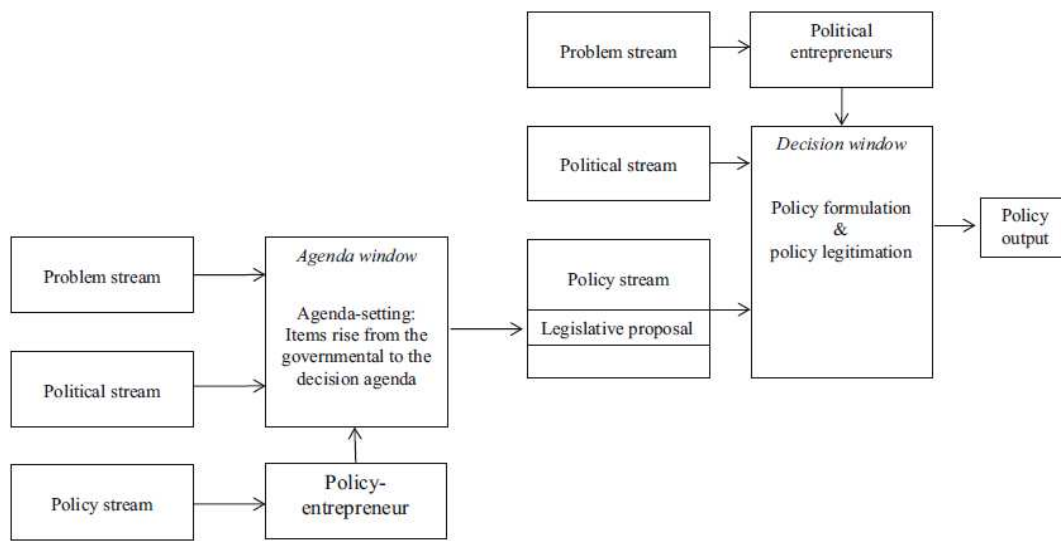
Source: [17]:445.

2 Methodology

The methodology reflects qualitative nature of the research. Most studies within MSF are based qualitatively [28]. Examined period covers years 2002 – April 21, 2006. In 2002, the sector of hospitals experienced significant changes due to public administration reform. Therefore, the year 2002 was selected as a starting point for the analysis as the year when agenda setting phase started. In April 2006, Act No. 245/2006 Coll. on Public Non-Profit Institutional Health Facilities passed and finished decision-making phase.

The research adopted a case study design [12] with the aim to gain in-depth insight in the political processes surrounding the new organisational-legal form of hospitals. The method of process tracing is applied. [6] Data were obtained through content (thematic) analysis of media and legislative documents. Media analysis covers five-year period January 2002 to December 2006 and focuses on 17 periodicals (including 6 nationwide dailies, 3 economic and political titles and 8 health sphere titles). Articles were obtained in the Newton Media Search electronic archive, and the search was based on two core search terms "hospital" and "non-profit". There were 1436 articles choose as relevant to the topic, and so to be researched.

The direct legislative data were analysed including law proposals (Bill 810/2004 on Public Non-Profit Institutional Health Facilities, Act No. 245/2006 Coll. on Public Non-Profit Institutional Health Facilities, Act 258/200 Coll. On Public Health Protection, Act No. 250/2000 Coll., on the Municipal Budgetary Rules) and Constitutional Court resolution (Pl.ÚS 51/06 from 27. 9. 2006). The other documents covered stenographic records, strategic documents (mainly of the Ministry of Health), political documents (e.g. the partisan document "Blue chance" made by ODS).

Analysed indicators follow multiple streams theory as defined by Herweg [16]. Within the problem stream, we work with both, the attention and interpretation (the topic to be stressed out by the actors to catch attention, in our case hospitals´ debt, risk of privatisation as well as framing of the change of the new organisational-legal form of hospitals). The policy entrepreneurs were identified according their attempts to raise attention to the problem or to change the framing. Within the political stream the main attention is paid to parties and interest groups (the third indicator, the mood of electorate was excluded due to a lack of data and unreliability of pre-election research). Within the policy stream the policy community and policy primeval soup are important for forming proposals and alternatives. In this stream, policy

entrepreneurs promote their ideas within policy and expert community to gain support for their alternatives.

Following Herweg's [16] distinction between agenda setting and decision-making stages, in agenda setting stage the term "policy entrepreneur" is replaced by term "political entrepreneur" to stress the fact that the insider has a higher possibility to couple streams.

3 Results

The following section introduces the focusing event and then it is set up according the categories of Multiple Streams Framework – problems, policies and politics. It covers events and decisions within each of these streams and maps their contribution to the coupling into window of opportunity.

3.1 Focusing event - Czech hospitals within public administration reform

Transformational changes in health took place very quickly at the beginning of the 1990s. The emphasis was put on the denationalization of health care, demonopolisation and decentralization, while development of the legal framework of health law was characterized by provisional solutions that however, persisted for a long time. Already since 1991, legal amendments have been made. They should have also allowed the privatization of medical facilities and in 1992, intentions of privatization of all hospitals were formulated with exception of large ones. The expected result of this step was that hospitals became in an organizational legal form of business companies. Privatization of hospitals was stopped in 1996 because of the risks of serious consequences. [3] Only a few dozen small hospitals have been transferred to limited liability companies.

The process of a non-conceptual approach in relation to the status of hospitals continued by a reform of public administration. The first two stages of the public administration reform launched in 1998, with the aim of changing the local government on the principle of decentralization and subsidiarity became a significant incentive for the change in the organizational legal status of hospitals. In the first stage 14 regions were established as higher territorial administrative units which have started their activities since 2001. In the second phase, there was a fundamental change in the functioning of the public administration at the lowest level, when the municipalities were divided into three levels and, as a result, the district offices ceased to end in 2002. District authorities were at that time owners and founders of district hospitals, as of 31 December 2002, 82 hospitals (out of a total of 203 hospitals) with about half of the bed capacity in the Czech Republic [29]. According to the fact that all assets of state contributory organizations established by district authorities were transferred at the end of the year 2002 to the regions, all those hospitals became the property of the newly established regions. It makes regions responsible for accessibility of public service – hospital health care [13]. The government on the basis of the Czech Constitution (Article 101 (4)) could not interfere in activities of regions [15]. The legislative preparation for public administration reform was considerably underestimated in hospital care [14] and the decentralization reform steps have led to uncertainty and inconsistency of the future development of the organizational legal form of former district hospitals. Actors of public administration and other health policy actors often politicized and medialized this issue and use such situations in political rivalry (e.g. the election campaign in November 2004).

Regions also took over hospitals' commitments which at the time included considerable debts [34]. Prior to the transfer itself, on December 10, 2002, the Chamber of Deputies discussed the Government's Report on the state of indebtedness of state hospitals, the settlement of these debts, and the legal transfer of hospitals to the region. The Chamber of Deputies assigned the task to the Ministry of Health to submit a proposal for a solution within two months. Thus, the Ministry presented the Thesis Concept of Medium-Term Policy (Thesis 2003) including the plan of the bill on healthcare facilities and their management. The Chamber of Deputies unlike the government refused the document.

Despite the previous claims, the state only partially eliminated hospitals' debt, about 60% [24]. The regions themselves could not use other gained "district" assets for debt relief because it could not be used for other purposes. Furthermore, an unused property had to be offered back to the state ownership. Hence, the regions began looking for other solutions. Act No. 250/2000 Coll., On Budgetary Rules of Territorial Budgets, allowed regions to set up their own organizational units whose legal form ranged from contributory organizations to community-based companies or business companies. It was in the transformation of hospitals to business companies that most of the regions (after elections in 2000 under the right-wing party ODS) saw the solution of the economic problems of the hospitals. The proponents considered the transfer to the joint stock company as the most appropriate legal form. This approach was strongly criticized by the ruling CSSD (left-wing party). They pointed out that the growth of hospital autonomy goes together with the danger of limiting the link to the public sector, reducing the role of the state and its ability to influence the development of hospital care.

3.2 Agenda setting

The topic of the hospital sector had been returning to the agenda since the late 1990s due to its repeated indebtedness. In the end of the nineties the problem stream had begun to shape again along with the public sector reform. According to Multiple stream framework the community has to be convinced that there exists a problem. While at the beginning it was framed as a problem of indebted hospitals (till the middle of 2003 this frame prevailed), after the final stage of the reform and hospitals transfer to the regions, the problem started to be reframed and the organisational-legal form was brought to the agenda. It had received a considerably larger attention as a result of the reform of the public administration with the abolition of districts and the constitution of regions in 2002.

Although the Ministry of Health already included the bill on Health Care Facilities among their goals in 2003, media and politicians started to deal with the issue of the organisational-legal form of hospitals immediately when the regions dominated by right-wing regional council chairmen began transferring hospitals to joint-stock companies. That was the focusing event that attracted the attention both politicians and the public. Debate had shifted from the issue of debts to the issue of organisational-legal form. Despite the consensus that the form of budgetary and contributory organisations was outdated, policy entrepreneurs promoted two significantly different framings. The first one, advocated by regional council chairmen, presented the join-stock companies as the best solution. The second one, held by left-wing government, stressed the risk of privatization and low access to health care and gave preferences to the non-profit form. The debate was supported by cyclical events, concretely regional elections and Senate elections in 2004. At the same time, the topic of organisational-legal form of hospitals was used for election struggle. Prime Minister Gross retrospectively considered the health issues as a poorly chosen topic for the regional elections. His government as well as latter Paroubek's government emphasized the creation of a law on healthcare facilities in their policy statement of government.

The chances of gaining political attention and support rise together with the preparedness of the appropriate solution. According the multiple stream framework there may exist pre-formulated policy solutions that are considered by government as appropriate ones and within the policy stream they may cut short political and experts disputation on the suitable policy.

In 2004, proposal on Public Non-Profit Institutional Health Facilities was initiated by the Czech Medical Chamber (CMC). Because CMC cannot propose a law in the Czech Parliament, it was subsequently developed by the Ministry of Health and proposed as the parliamentary initiative (proposed by MP Krákora). In that time the proposal had been already widely discussed. However, in the end of 2004, the Minister of Health was not satisfied with the proposal and announced an intention to suggest her own version.

Beside, Julínek (ODS, the right-wing party) presented his idea of the health care system with hospitals as the joint-stock companies (the document Blue chance). He endeavoured to bring his ideas to life when he became the Minister of Health in 2008. There was also World

Bank expert group invited (lead by Mukesh Chawla) but there had not been published any findings.

Unlike the policy stream with the dominant role of argumentation, the political stream is based more on negotiation and power-play. The political stream reflects the political mood and openness to change that reflects the current political climate in society (including personnel changes in executive and legislative power, interest group campaigns).

The election of 2002 was won by the CSSD, which had 101 votes in the Chamber of Deputies with two other coalition parties. After the elections to the Senate in 2004, the number of coalition senators decreased. In the same year votes of the parties of the government coalition also dropped significantly in the regional elections. Due to delay in the preparation of Act on Public Non-Profit Institutional Health Facilities as well as the efforts of the governors to accelerate the transfer of hospitals to the joint-stock companies, the first attempt using blocking mechanism was made to stop the transfer of hospitals. It was incorporated into so called the Act on Noise, but it was not approved. Both the Senate and the President used their veto. Presidential veto was not overvote by Chamber of Deputies.

All three streams succeeded to couple in December 2004, when the first reading of the bill took place in the Parliament despite governmental objections.

3.3 Decision-making

Decision-making period lasted almost one and half year. The problem stream had not changed in fact - the key problem laid in unsatisfactory organisational-legal form of hospitals. The general argumentation started to be stronger than in agenda setting. Moreover, quite often left-wing politicians and some of the actors from the medical sphere stressed the risk of transformation of hospitals into the form of business companies. They pointed out the risk of lower access to the medical care and misappropriation on the hospital property. The right-wing politicians framed the problem as a re-nationalisation of property as in the 1950s when the Communists regime started.

Within the policy stream the parliamentary initiative continued as Bill no. 810 on Public Non-Profit Institutional Health Facilities. But in 2005, the new Minister of Health Rath (ex-president of CMC) came up with a new proposal that provoked protests from many actors. The main reason was the planned compulsory transfer of former district hospitals in a non-profit form. In addition to that, regional council chairmen claimed their intention to work on their own proposal in favour of joint-stock companies in January 2006.

The political stream played the key role in decision-making process thanks to the current composition of parliament. Unfinished Act on Public Non-profit Institutional Health Facilities and ongoing transfer of hospitals evoke another attempt to stop the transfer of hospitals in the legal form of joint-stock companies. Deputy Chairman of the Chamber of Deputies Filip (KSČM-communist party) proposed second blocking mechanism as part of the amendment to Act 258/2000 Coll., On Public Health Protection. Despite the Senate veto and Presidential veto, the Act was passed by the Parliament in August 2005. But it did not have a real effect because most of the hospitals had already been transformed into the joint-stock companies. Also, regional council chairmen immediately reacted with announcement that they filed a complaint to Constitutional Court. Some regions were about to use legal loopholes to avoid the concept of "change of legal form" by setting up new business companies.

In relation to hospitals, both governments (Prime Ministers Gross in 2004 and Paroubek in 2005) in their program declarations emphasized a creation of a law on healthcare facilities and a creation of a network of healthcare facilities. The Bill. 810 passed but the Chamber of Deputies had to overvote the Senate veto (April 2006) and the President veto (May 2006).

After one and half year since its first reading in the Parliament, i.e. since the beginning of decision-making stage, the three streams succeeded to be coupled in May 2006.

3.4 Discussion

Despite later attempts to change the organisational-legal status of hospitals and two policy window openings (in 2008 and 2017) the analysed situation was the only one which led to the successful end of the whole process including agenda-setting as well as policy-making. The analysed process of approving the Act on a new organisational-legal form of hospitals confirmed the usefulness of distinguishing between agenda coupling and decision coupling as Herweg [16] proposed. In case of agenda-setting phase, all streams played a role for agenda coupling anyway the window of opportunity opened within the problem stream. The problem window opens when the problem threatens the policy maker´s re-election. The emphasis on framing the problem increased from both sides of the political spectrum by upcoming elections (in 2004) when the new organisational-legal form started to be the subject of sharp discussions in media and parliament discussions. The policy stream played a significantly lower role because there did not exist a prepared proposal and it took two years to offer one that was initiated by the interest group outside the political parties.

The political stream became the most significant in the decision coupling because of one vote majority in the parliament. Its importance was obvious when Senate and later President veto were outvoted. The window of opportunity opened within the political stream, and even though the Bill within the decision coupling underwent significant changes, it was approved.

The decision-making and agenda-setting processes differed in the role of entrepreneurs because policy and political entrepreneurs use different strategies. The whole process took a long time, so it was possible to identify the entrepreneur who took part in it as both, a political entrepreneur and a policy entrepreneur. Concretely, the Minister of Health (after 2005) played this specific role because he was previously the Head of the Czech Medical Chamber, the institution that made an original proposal of Public Non-Profit Institutional Health Facilities.

4   Conclusion

In this article, the case study shows how the fields as health care can be explained through multiple streams framework and how the concepts such as streams, policy windows and policy entrepreneurs can be useful for interpretation of the Czech case. It is valuable within the framework to distinguish the agenda-setting, and decision-making process as Herweg [16] proposed. Although the framework offers a broad and various approach to analysing the policy change, it is not comprehensive. It would be useful for future research to verify its applicability by conducting research of other cases within the health care field.

Acknowledgements

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What Matters in Social Media Engagement?
Czech Social Service Organizations´ Example

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Abstract

The social media effect is greatly affected by an ability of organization to engage its community and stakeholders. Therefore, the study primarily aims on communication published on organization´ social media and on engagement related to the nature of service, respectively related to the content type of post. At the first research phase, the research sample is composed of 185 nonprofit nongovernmental organizations from the field of social services and located in the Czech Republic. At the next research phases, an in-depth analysis of 550 Facebook posts published by 55 organizations is conducted. An engagement rate is measured with a set of metrics, including responsiveness, involvement, and virality. Results showed that social service organizations use Facebook as their primary social medium. Moreover, stronger statistical differences in engagement were found according to the organization´ primary orientation than according to the content type of posts. Statistically higher engagement rate was recorded in organizations oriented on children and youth, homeless people, and physical disabilities. Vice versa, the lower engagement was found in organizations dealing with family problems, mentally disabled or integration of foreigners.

1 Introduction

"Social media are not tools; they are collections of people. People ready to be engaged, ready to take action, ready to be inspired" [9:13]. Social media (SM) aren't just a new piece of technology; they can also be considered as a new form of engagement of nonprofit´ stakeholders. Harnessing this power can have dramatic effects on non-profit outreach in marketing, communications, and fundraising initiatives [9]. SM facilitate dissemination and sharing of information to organizational stakeholders; they are mainly represented by platforms as Facebook, Instagram, Twitter, or YouTube, communication technologies as Skype or SecondLife, and professional tools as LinkedIn or ResearchGate [2-4]. These SM are greatly useful to enhance mutual communication between the organization and its local community including employees, volunteers, donors, politics, partner organizations and other stakeholders.

1.1 Current research on social media use in non-profit sector

SM have commonly begun to be used in a various field of governmental and private nonprofit sector. Prior research orientated on SM use by nonprofit organizations started by investigation of what organizations offer on their SM presentations in 2009 [13]. In 2012, Lovejoy and Saxton [10] developed a model for coding content published through SM; this model classify content on three main types: (a) information, (b) community (including giving recognition and thanks, acknowledgement of current and local events, responses to reply messages, response solicitation), and (c) action (including promoting an event, donation appeal, selling a product, call for volunteers/employees, lobbying and advocacy, join another site or vote for organization, learn how to help). In 2014, Cho, Schweickart, Haase [4] identified levels of community engagement where likes reflected a low engagement level, sharings reflected moderate engagement level, and finally comments reflected high engagement. In 2016, Huang, Lin, and Saxton [6] criticized one way informational message due to its ineffectiveness and

recommended dialogic communication between nonprofit organization and stakeholders. Finally, in 2017, Kim and Yang [8] in their study concluded that different communication (message) generate different behaviour of users. Sensory and visual message generates like; rational and interactive message generates comment, and sensory, visual, and rational generates sharing.

Moreover, various conceptual frameworks were designed to capture an engagement on Facebook page related to the environment of business [7] and public organizations [3]. Jan H. Kietzmann at al. [7] designed a honeycomb framework to investigate facets of the social media from user experience. It dealt with following aspects (blocks) of social media: identity, conversations, sharing, presence, relationships, reputation, and groups. Each block comprises (1) specific facet of social media user experience, and (2) its implication for firms. The framework is frequently used for description of Facebook and Youtube engagement. Bonsón, Royo, and Ratkai [3] developed metrics as popularity, commitment, virality for Facebook page total engagement measurement in public sector.

Regarding the geographical location, the highest number of research studies in the field was conducted in the U.S.A. and Western Europe. However, only a limited amount of studies concentrated on research in area of engagement by the Facebook sites. Regarding specifically situation of Central Europe, there were 156 research studies in Web of Science relevant to SM or social networking sites topic from Central and Eastern European´ (CEE) authors published from 2015 to 2019. Analysis of these studies showed that majority of them are dealing with business economics, business communication, or educational research. However, only Macek, Mackova, and Kotišová´ study [11] dealt with the nonprofit sector, specifically with structure of civic practices with respect to social and political contexts.

Nowadays, despite of the high impact of previous research, it should be stated that frameworks are, at least in some sense, a bit outdated. Application of Kietzmann´ [7] framework is limited by his main orientation on business sector and an encounter of Bonsón, Royo, and Ratkai´ [3] metrics is obsolete due the Facebook revision of engagement rate. However, due to relative proximity of public and nonprofit sectors, Bonsón, Royo, and Ratkai´ framework was adopted and transformed for the needs of nonprofit field by the author of this study. On one side there is a communication content made by organization and send to the organization´ community. On the second side there is a community which provides questions, feedback, and involve in organizational mission by volunteering, donors, etc. Both sides together co-producing new values, ensure transparency and manage volunteer and firms´ involvement. A revised framework is available in Fig. 1.

Figure 1: The role of SM in mutual communication between local community (C) and organization (O)
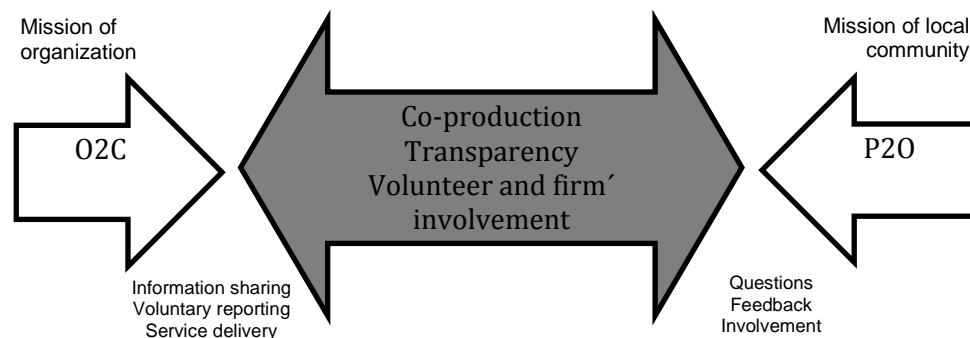
Source: Author.

As the lack of research studies on engagement in CEE countries as well as on factors influencing engagement rate was documented, following three main research questions were defined: (1) How do organizations communicate through social media? Which one do they use? What do they publish?; (2) How much is engagement of Facebook community affected by the

service orientation of organization?; and finally (3) How much is engagement of Facebook community affected by the content of posts, what actually represents the way of communication towards to the community.

2 Material and methods

2.1 Research design and the sample

Gathering of research sample was conducted in several steps. At first, the websites of 185 organizations listed in Nadace Neziskovky.cz´ catalogue [12] and the section Social Services and Health were examined in relation of social media use. For higher consistency of the sample, the organizations without available Facebook and without employees were excluded from the sample.

At second, the Facebook pages of 109 private social service organizations were analysed. However, it was found that some organizations, mainly with smaller number of friends and followers are not operating their pages properly. An incorrect page management consisted mainly in publishing the same or similar posts repeatedly, publishing of higher number of posts at the same time period, lacking the use of multimedia in posts (pictures, videos, thumbnails), or in only its inactivity. As this negative practice could distort results on engagement, organizations with less than 500 Facebook friends were excluded from the sample.

At third, the sample of 55 organizations with functional Facebook page were analysed in detail. Regarding the legal form the registered associations (30.9 %), public beneficial organizations (25.5 %), registered institutions (21.8 %), and church organization (21.8 %) were represented in the sample. Regarding social services, the sampled organizations usually perform more than one main service, thus a primary service was identified for each organization. Unfortunately, it was not possible to do it for all them, organizations without primary service are labelled as "with multiple services". In the sample were present mainly organizations providing services to children and youth incl. children in hospitals, children´s homes and fosters (14.5 %); family issues incl. family counselling, domestic violence and family housing (14.5 %), physical disabilities, incl. housing, care and working opportunities (12.7 %); multiple social services where the primary orientation was not clear (12.7 %); mental disabilities, incl. early care or protected workshops (10.9 %); issues of addicted and punished (9.1 %); elderly (5.5 %), homeless (5.5 %); integration of foreigners and other ethnics (5.5 %); and others, incl. social services in hospitals, humanitarian aid in abroad, volunteering, or social counselling online (9.1 %).

At fourth, ten posts of each organization with functional and properly managed Facebook page. Thus, 550 posts were analysed in detail. Following content classification of posts was developed during coding and with inspiration of a post content: information on the services provided; event invitations; events passed; presentation of job vacancies; information on finance donation; information on non-financial donation; recognition and thanks; volunteering and involvement appeals; and timeline/profile updates.

2.2 Research method and data gathering and processing

The research uses a content analysis of Facebook pages as a main method. Such analysis conducted in an online environment is a part of so-called Internet mediated research [5]. For measuring of engagement rate, several metrics and frameworks were developed and previously mentioned. The set of metrics, including responsiveness, involvement and virality, is used in this study. Responsiveness represents number of the reactions on a specific post. In 2016, set of new reactions (love, haha, wow, sad, and angry) was introduced by Facebook. Such new reactions improve quality of communication between an organization and the page visitors as they can express more emotions, including negative ones. Involvement, represented by the number of comments, is not only much more time-consuming, but it is also more binding for its writer. The last metric – virality is determined by the number of posts shared. Such behaviour of the page

visitors results in great multiplication of post views. Detailed description of areas for content analysis and the method of data collection is available in Table 1.

Table 1: Description of methods for the data collection

Area	Description of area	Method of Data Collection
Responsiveness (R)	It is determined by number of reactions. Likes represents lower responsivity than other new types of reactions as wow, haha, sad or super	Number of reactions per post published
Involvement (I)	It is determined by the number of comments. This kind of reaction is much stronger than simple like or any of other new symbols	Number of comments (only first level comments were counted) per post published
Virality (V)	It is determined by the number of post sharings. It is considered as the strongest type of reaction.	Number of sharings per post
Engagement (E)	E = R+(2*I)+(3*V)	

Source: Author.

The data were analysed and coded by one coder to prevent possible distortion of results. The data were collected during five days from January 19 to January 23, 2019. However, the posts included in the research were published by organizations from Nov 2018 till Jan 2019 due to fact that ten posts from January 19 and backwards, were analysed. Data were statistically processed in SPSS 24.0.

3 Results

3.1 Social media communication towards the community

We have found that social service organizations use primarily Facebook (95.1 %). The rest of social media is exploited in much less extent: YouTube is used by 35.3 % of organizations, Twitter by 19.6 % of organizations, and other social media as Instagram, LinkedIn, Google+, and Pinterest totally in 17.6 % of organizations. Regarding the number of SM, the Facebook as an exclusive social medium, use more than half of organizations (52.0 %). Then, the Facebook together with YouTube is used by 14.7 % of organizations. Facebook, YouTube and Twitter are then available in 12.7 % of organizations.

As organizations communicate mainly on Facebook the detailed analysis on communication was conducted on this social medium. It was found that social service organizations communicate mainly information about their services (27 %), this communication includes for example new facilities, where the service is provided, improvements of service quality, or testimonials of service users. Publishing of post with recognition and thanks to stakeholders was found in more than one fifth of posts (21 %).

It is important to remind that data collection was gathered also during a New Year and Christmas time which could increase percentage of content associated with future or passed events as well as recognition and thanks type of posts. Interestingly, organizations publish more invitations for events (14.2 %) than information about events passed (9.6 %). Representation of other organizational messages communicated is probably relevant to daily operational activities and its frequency. Detailed results are available in Graph 1.

Graph 1: Structure of communication published on Facebook
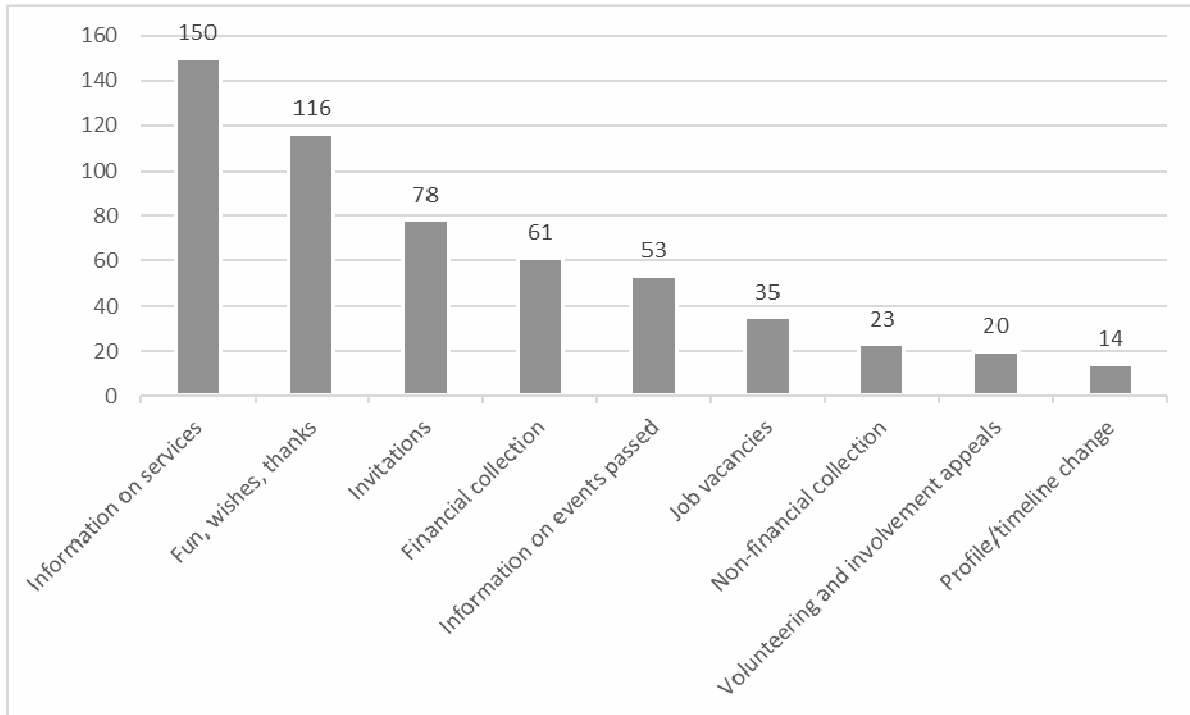
Source: Author.

3.2 Total engagement and service orientation

The highest engagement was found in organizations working with the children and youth. There were five organizations with this orientation in the top ten ranked by engagement score. These organizations work in foster care, general care for children, actor visits to children hospitalized, or seeking financial support for the treatment of children. Each of other five organizations represented different orientation. Remarkably, all organizations with the highest engagement dispose of strong local (offline) community. On the other hand, a significantly lower engagement – less than a quarter compared to children and youth category – was found in organizations focused on family problems, working with mentally disabled and focused on integration of foreigners.

Strongly significant differences based on the nature of service were confirmed by analysis of variance results (F-value = 9.630; Sig. = 0.000). Moreover, post hoc and Tukey HSD testing showed that two homogenous groups can be classified in relations to engagement level. The first, with high engagement rate, would comprise orientation on children and youth, homeless people, and physically disabled. The second, mainly on addicted and punished, elderly, family issues, mental diseases and integration of foreigners.

Regarding the responsivity, involvement and virality, there were not significant contradictory results found. The only exceptions might be mainly low involvement of comments among children and youth organizations´ community and vice versa relatively high level of involvement about organizations working on the field of integration of foreigners.

Detailed results on responsivity, involvement, virality as well as total engagement are available in Table 2.

Table 2: Responsivity, involvement, virality and total engagement according service orientation

Orientation	Likes*	Comments*	Sharings*	Engagement**
Children and youth	66.6	2.4	11.9	107.1
Homeless people	40.5	0.8	8.8	68.6
Physical diseases	45.8	0.9	5.3	63.6
Addicted and punished	23.6	0.7	4.6	38.7
Other	22.7	0.4	4.0	35.6
Multiple services	13.5	0.3	6.1	32.4
Elderly	20.2	0.5	2.8	29.5
Family issues	8.3	0.1	4.8	23.0
Mental diseases	11.3	0.4	3.5	22.5
Integration of foreigners	16.6	0.8	1.4	22.3

Average number of likes/comments/sharings per one post
** *Engagement = (number of likes*1)+(number of comments*2)+(number of sharings*3)*

3.3 Total engagement and post content (activity published)

Relevant Facebook community of examined organizations was highly engaged in the content associated with non-financial collections. Such activities included the demand for clothing, ceramics furnaces, benefit fairs and more. Most of the post content types – seven out of nine – obtained score over 40 pts. Remaining two content types as invitations for events and timeline or profile updates obtained much lower engagement score 20.1, resp. 16.1 pts.

Statistical analysis showed that differences among types of posts are statistically significant (F-value = 2.083; Sig. = 0.036). The analysis has not showed so strong differences as in the case of organizational orientation. Although according to the score results there are two remote content types (invitations for events and timeline/profile updates), the post hoc tests and Tukey HSD testing do not allow to classify results into homogenous groups.

Table 3: Responsivity, involvement, virality and total engagement according to post content

Orientation	Likes*	Comments*	Sharings*	Engagement**
Non-financial donation appeal	22.9	0.9	14.2	67.2
Financial donation appeal	32.0	0.6	7.6	56.1
Information on services	35.9	1.1	5.7	55.2
Events passed	43.2	0.8	3.4	54.7
Recognition and thanks	35.6	1.3	4.8	52.7
Appeal for involvement	12.8	0.2	10.2	43.6
Job offerings	11.3	0.3	10.3	42.7
Invitations for events	12.1	0.2	2.5	20.1
Timeline/profile updates	11.4	0.1	1.5	16.1

Average number of likes/comments/sharings per one post
** *Engagement = (number of likes*1)+(number of comments*2)+(number of sharings*3)*

4 Discussion and conclusions

Various implications for non-profit social service organizations can be raised over the paper findings. Following we consider as pulsating:

a. Up-to-date state of art in the field of social media use by social service organizations was identified. Approximately half of organizations (50.6 %) with employees is communicating on social media, primarily they have available functional Facebook (95.1 %) site. Other media as YouTube and Twitter are used in much less extent and not on a regular basis.

b. Strong significant differences among engagement according to organization´ orientation exist; the services in favour and out of favour of stakeholders were identified. Highest attention of social media users is paid by organizations with children and youth services; on the other hand, the least attention is given to services oriented on family issues, mental problems and integration of foreigners.

c. Also, there are statistically significant differences in engagement according to the content type of post published. However, they are not so high as in a preceding case. Preferred and not preferred content types of posts represented were identified. The highest engagement of users was recorded for posts with non-financial donation appeals.

Although presented study implications can be successfully applied into managerial practice of relevant organizations, there are many other research challenges in the field. Firstly, this research can be expanded to larger area of nonprofit sector to identify relationships between and engagement rate and organizational characteristics. Secondly, other social media platforms analysis, namely Instagram due to its rapid increase of users, deserve research attention. Thirdly, the next metrics including Facebook page speed of reaction, review and community sections of the page and others can be analysed. Finally, an in-depth analysis of Facebook fan and follower base can be conducted to obtain better understanding of Facebook organization´ community.

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Project Management Teaching at Czech Public Universities in the Context of Project Manager Competencies Covered within the National Competence Baseline of Project Management, version 4

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Abstract

The aim of presented paper is to synthesize the results obtained by comparison with desk research and consultations carried out at selected Czech public universities in the academic year 2018/2019 in order to identify the coverage of the project manager competencies mentioned in the National Competence Baseline of Project Management, version 4, in lectures, exercises or seminars, of course Project Management and transdisciplinary in the context of teaching of related managerial and economic courses. The benchmark was the National Competence Baseline of Project Management (NCB), version 4 issued in 2018. Due to the availability of relevant information resources for the realization of desk research and consultations, the survey was conducted at VŠE Praha, ČVUT Praha, VUT Brno, UP Olomouc, VŠB-TU Ostrava, as a sample of universities in which some form of project management is taught. We used an analysis of the available documents, specifically NCB ver. 4 with an emphasis on the identification of project manager competencies in the context of meeting the requirements for candidates for D level certification of project managers. Further syllabuses of managerial and economic courses of individual analyzed universities were used. Valuable backgrounds were the personal consultations with guarantors and teachers of relevant courses during the winter term of the academic year 2018/2019. The prerequisite for the comparison of the outputs obtained through the desk research and consultations is the content of the certification exam for the D level certification. Important information is the fact that the presented paper does not compare the quality of teaching, but only the content of the subject matter in the analyzed courses.

Keywords: Project management; teaching; project manager; IPMA; certification.

JEL Classification: A23, I21, L84, M53.

1 Introduction

Currently, project management has become a part of the everyday lives of many individuals and groups - projects are being used to develop new products, technologies, to build motorways or to provide education. A number of official certifications have also been developed to record the knowledge of the project manager or members of the project teams, as well as to broaden and to consolidate their outlook in this area within the context of the subsequent practical project actions. Until the 1950s, there was no systematic theory of project management, and individual complex projects were implemented more or less on an ad hoc basis. Since then the experiments to systematize the processes from a variety of disciplines and to create a coherent management theory whose principles would be applicable in different situations, have begun. Since that time these companies have begun to offer a comprehensive theory, education, and exams as a proof of knowledge.

One of the companies, IPMA (International Project Management Association), was established in Europe in 1967, merging under the federal framework of national management associations. The branch for this company in the Czech Republic is IPMA CZ, which was established to implement the IPMA® certification process. The Certification Body is a professionally independent component and is responsible for ensuring that the certifications comply with the certification scheme described in the IPMA® Certification Regulations

Guidelines. IPMA certification is graded according to difficulty. D level certification is intended primarily for project team members. It is also suitable as a proof of theoretical knowledge in project management. Next services offered by IPMA include National Student Certification. This certification is offered to students interested in expanding and improving their project management knowledge. The main importance of this certification is to increase the quality of project management after the students start working. This certificate confirms that the student is able to work in the conditions of project management with regard to the field of education.

Despite the above-mentioned the project management teaching at Czech universities is not a condition and a matter of course yet. However, with the growing interest and demand on project managers and project team members, the development of this discipline is currently appearing at the universities. Especially in technical or economic fields, there is a high probability that the graduate will, at least for some time, become a member of the project team.

The expected output of the presented paper is therefore the exhaustive identification of courses taught at Czech universities, which mostly cover the requirements for preparation for certification of project managers according to IPMA, level D.

2   Material and Methods

The aim of presented paper is to synthesize the results obtained by comparison with desk research and consultations carried out at selected Czech public universities in the academic year 2018/2019 in order to identify the coverage of the project manager competencies mentioned in the National Competence Baseline of Project Management, version 4, in lectures, exercises or seminars, of course Project Management and transdisciplinary in the context of teaching of related managerial and economic courses. The benchmark was the National Competence Baseline of Project Management (NCB) [17], version 4 issued in 2018. The desk research was realized in time period October – November 2018. We used an analysis of the available documents, specifically NCB ver. 4 with an emphasis on the identification of project manager competencies in the context of meeting the requirements for candidates for D level certification of project managers. The goal of the desk research was to find as much information as possible on project management teaching at Czech public universities. The research was carried out by mapping the websites of Czech public universities. On this websites the attention was focused primarily on study plans and curricula, lists of courses, or syllabuses of individual courses, in order to find curricular documents related to project management teaching. Here, a major deficiency related to this type of research was discovered, namely the impossibility of tracing the curriculum documents of project management teaching at a number of universities. Another identified deficiency was the inconsistency of the information obtained. In cases where a specific curriculum was found, this document did not always contain all the required information. Often the timeliness of the document or the information provided was not clear. The universities that do not have a published curriculum of the course usually have a short description in the curriculum or in the course information. This description is of a more general nature and serves as a basic information source for the content of the course, or its goals. These universities have been excluded from our desk research. Due to the availability of relevant information resources for the realization of desk research, the survey was conducted at VŠE Praha, ČVUT Praha, VUT Brno, UP Olomouc, VŠB-TU Ostrava, as a sample of universities in which some form of project management is taught.

Valuable backgrounds were personal consultations with guarantors and teachers of relevant courses during the winter semester (time period October – November 2018) of the academic year 2018/2019. We realized 9 personal consultations (3 consultations with guarantors per VŠE Praha: 2 men, 1 woman, 1 consultation per UP Olomouc with the guarantor: woman, 1 consultation per VŠB-TU Ostrava with the guarantor: man, 2 consultations per ČVUT Praha with the guarantor of the course, man, and with one teacher, woman, and VUT Brno, with the guarantor of the course, man, and with one teacher, man. Each consultation lasted 15-20 minutes and the aim of the consultation was to identify the percentage coverage of required

curriculum for the certification with the requirements on students in the context of the implementation of particular elements into the project management teaching. All evaluations are based on the subjective evaluation of the respondents.

The prerequisite for the comparison of the outputs obtained through the desk research and consultations is the content of the certification exam for the D level certification, which was divided according to the competency elements identified in the NCB ver. 4, and each competence set was assigned the appropriate score (see Table 1).

Table 1: Scoring the inclusion of individual project management elements in the courses

Competencies	Inclusion of competence areas into tests in %	Number of elements of each competencies	Scoring of each elements of competencies	Scoring for the area of competence in total	Total points
Technical	70	20	77	1540	
Behavioral	15	15	22	330	2200
Contextual	15	11	30	330	

Source: Authors.

The result of the desk research is the authors´ subjective evaluation of the percentage coverage of required curriculum and the result of the consultations is the project management courses guarantors´ and teachers´ identification of the percentage coverage of required curriculum. This paper presents the final percentage coverage of required curriculum for the IPMA level D certification based on the arithmetic mean of previous results following from the desk research and consultations. The inclusion of individual elements into the teaching will be enumerated even if the course will only partially overlap with their contents. The introduction of students with a particular issue will also be taken into account. This assessment will not, therefore, compare the quality of teaching, which for obvious reasons is rather difficult and subjective, but only coverage of the certification requirements for the substance being studied.

3 Project Management Teaching

How to teach Project Management at universities? Such work has not been found regarding the curriculum documentation of universities with a focus on project management teaching. The analysis of project management teaching at Czech universities is dealt in [9] or [10]. Overall, however, this issue is fundamentally unresolved and unspoken in the Czech environment.

Foreign information sources are much more saturated in this area. Modern methods of project management teaching are addressed internationally by [19]. The author identifies the state of the art related to the use of serious games for understanding, teaching and supporting education of the standard ISO 21500 with the goal of proposing a simulation-based serious game that supports its management processes in the context of software projects. A multivocal literature review was conducted and a simulation-based serious game, called ProDec, was proposed. The author analysed the coverage of the management processes, the process and subject groups of the ISO 21500 that ProDec is able to provide, and they conducted an empirical evaluation to assess the educational effectiveness of the game in terms of motivation, user experience, and learning outcomes. He realized that ProDec is able to cover 7 of the 10 subject groups and almost 75% of the project management processes of the ISO 21500 standard. Moreover, all the participants, involved in the empirical evaluation, expressed positive comments that ProDec stimulated their motivation, offered a positive user experience and promoted the learning of the management processes involved in these 7 subject groups.

The importance of practical experience in the project management teaching at the colleges and universities is mentioned in [14]. In this paper is presented the insights into the importance of practical experience in project management success and discussed how well university education prepares future project managers in terms of practical project learning approaches. The paper provides an example of a multidisciplinary collaboration experience between courses,

applied at Qatar University. The initial results of students' assessment suggest that multidisciplinary collaboration can provide a unique learning experience to develop the students' managerial skills by integrating learning outcomes and performances.

The justifiability of the use of information technology in project management teaching is documented in [4] and [28]. Other case studies providing relevant information on project management teaching at and universities have been published in [27], [13], [15], [11], [2] or [3].

The development of soft skills in project management teaching at the University of Vienna is described in [8], developing the project managers' competencies in India is described in [6], and [7] describes the teaching of teamwork for project management. [16] designed a university education and training project management project that takes into account the diversity of the basic characteristics, needs and expectations of the Millennials and Baby Boomers. [18] defines the necessity to create a European way of Master education in project management. In this case already was developed a portfolio of six Master programmes at different European universities. These programmes are closely interlinked with exchange formats for students, scientists and lecturers, double degrees and a joint research community. The programmes follow a similar philosophy and didactic model. They have a synchronized and aligned curriculum. The intended competence profile for the graduates is aligned, too, while still being differentiated by local specialization modules and different target groups.

4 Results and Discussion

VŠE Praha offers several courses related to Project Management: Project Management, Project Manager Competencies, Project Management Methods and Standards. The aim of the **Project Management** course is to introduce students to basic techniques, models and methods of project management (VSE©2018a). Students will learn how to use MS Project as standard project management software. The objective of the **Project Manager Competencies** course is to orientate the student in the socio-psychological context of the management and functioning of the project team. The course focuses on the development of managerial competencies of project managers, including management of the project team, as well as the principles of effective project team work from the point of view of its members. The course is based on the consideration that the effective functioning of the project team is not only conditional on the knowledge of technical procedures and methods, but also of team leadership skills. This course is taught at the Faculty of Business Administration and is recommended for the first year of the Master's degree course (VSE©2018b). The course titled **Project Management Methods and Standards** aims to prepare students for professional certification exams. This is not IPMA certification but PMI certification, specifically Certified Associate in Project Management (CAPM®). Students will get acquainted with the methodologies and standards of project management and will meet the actual practices in the field, which discuss the success of the implementation, the management of the change projects, the specifics of the given branches, etc. In order to fulfill the course aim the students are supposed to have passive knowledge of English (VSE©2018c), because they have to work with origin material and tests. Students learn about existing international standards, such as PRINCE2 and OGC, CzNCB, while focusing in detail on a single PMBoK Guide [1].

The course entitled **Project Management** taught at the Department of Project Engineering (at the Faculty of Information Technology of **ČVUT Praha**) aims to prepare students for the IPMA Grade "D" International Exam. During the semester, students will learn how to understand the philosophy of project management, get an overview of the project management terminology, and gain insight into project management methods and procedures, which they will gradually acquire and learn to apply them effectively. Other important components of the course are so much appreciated "soft skills", the ability to ask the right questions and to formulate own insights (CVUT©2018).

The course entitled **Project Management** taught as compulsory at the Bachelor's program of the Faculty of Business at **VUT Brno** is the third year accredited by IPMA Czech Republic and

is taught in close connection with the IPMA methodology. According to VUT (VUT©2018), the course clarifies the current trends and international standards of project management. It mainly deals with project planning and management so that projects can be completed in time, in the required quality and within the budget. This course aims to prepare students for the IPMA certification exam.

The course **Project Management 1** at the Faculty of Philosophy of the Palacký University in Olomouc is intended as compulsory for students of Master's degree program in Psychology. The aim of the course is to familiarize the students with the basics of project management, presentation of individual methods and principles of this form of management and practical training.

Course **Project Management A** is designed for students of bachelor's study at the Faculty of Economics, **VŠB-TU Ostrava**. The main part of the course deals with project planning using MS Project software support. Students learn to practice the theoretical knowledge on a practical project using software technology. Practical lectures of experts are also a part of the seminars, where students can deepen their knowledge of project management with the approaches and problems of the given field in different fields and different professions. The aim of the course is to acquaint students with basic approaches and methods in project management (VSBTU ©2018).

4.1 Results comparison

The results and comparison of the individual courses are described in Table 2 bellow.

Table 2: Results comparison

University	Course	Number of elements of the individual competencies included in the teaching		Preparation of certification %	Course specification
VŠE	4EK411	Technical	10	38,7	The course provides students a good theoretical background for possible deeper study of technical specifications.
		Behavioral	1		
		Contextual	2		
	3PS532	Technical	4	21	The course focuses primarily on teaching of behavioral competencies.
		Behavioral	7		
		Contextual	0		
	3MA534	Technical	20	100	The aim of the course is to prepare students for a certification exam according to PMI, not IPMA.
		Behavioral	15		
		Contextual	11		
ČVUT	BU - PRR	Technical	20	74	The aim of the course is to prepare the students for the certification exam according to IPMA, level D.
		Behavioral	4		
		Contextual	0		
VUT	FP - BrpP	Technical	17	68	The course is accredited by IPMA CZ and is taught in close connection with the IPMA methodology.
		Behavioral	4		
		Contextual	3		
UPOL	PCH/PROM	Technical	13	48	The course is focused on the teaching of technical competencies and the subsequent practical training of individual methods and principles.
		Behavioral	1		
		Contextual	1		
VŠB - TUO	157 - 0361/01	Technical	12	48	The course is focused on practical training of methods and principles of technical competencies.
		Behavioral	1		
		Contextual	4		

Source: Authors.

The best assessment was achieved by course **3MA534 Methods and standards of project management** (VŠE Praha). All elements of project management competencies are formally included in the course, but the learning of these elements is, of course, done in a very timely manner, and the student would have to deepen the knowledge of the individual elements in the actual IPMA certification level D. However, the PMBoK [1] and NCB standards are closely interconnected in some parts as is cited in [12].

The course **BU - PRR Project Management** (ČVUT Praha), reached high assessment as well, and prepares students for certification examinations according to IPMA from seventy - four percent. All the elements of technical competencies that are most focused on IPMA level "D" certification are reflected in the course. Elements of behavioural competencies are discussed here in a very marginal way, contextual competencies are not related to the teaching at all. This course is intended primarily for students who are interested in deepening their knowledge outside of IT, gaining new knowledge of project management and, if possible, extras. The fact that the dominant component is a field of technical competencies is in perfect harmony with the intuitive image that we have about CVUT Praha.

The **FP - BrpP Project Management** course (VUT Brno), which will provide the preparation required for passing the certification examination from sixty-eight percent, was also excellent. Teaching is most focused on the area of technical competencies elements. It complements the content of other compulsory courses of the Bachelor's degree program so that the students are able to pass the "D" level IPMA certification exam. Four key areas of project management are being trained in the course: designing a project strategy, effective project planning, project management principles, and project termination. Part of the training is also software support for project planning and monitoring. Students will learn how to work with MS Project during the semester, where the output will be created by the project plan. The aim of the course is to acquaint students with the internationally recognized principles, trends and procedures of project management and to teach them effective use of information and communication technologies in the given field.

5 Conclusion

The best assessment of analysed courses at selected universities was achieved by the course *Methodology and standards of project management* taught at **VŠE Praha**. However, it should be recalled that this course prepares mainly for the PMI certification exam and that the individual elements of competency needed for the IPMA exam are all mentioned in the course, but in no way can it be said that this preparation would be sufficient for the IPMA candidates. That is why we would like to mention the course **Project Management**, which is taught at **ČVUT Praha**. The aim of the course is the preparation for the given certification exam itself and, in terms of requirements for the candidates, the course covers approximately seventy-four percent of the required knowledge.

From available information, it can be assumed that a number of universities in teaching are based on world-class project management standards, and also teach the tools and methods that are based on these standards. A significant part of the primary literature also comes out of the world's standards. Another gained knowledge is that the courses are taught mainly at the Master's degree, where it is part of the specialization, and the signing of this course is often optional. Regarding the time subsidy of the course, it was most often quoted 1,5 hours per week during one semester. It has also been found that the course is partially focused, so it is taught on a full-time basis and in addition to completing a written test, completion of the team project is required. Due to the practicality of the course, compulsory attendance is required. Part of the universities also offers their students the opportunity to obtain certification in project management. Here, it is necessary to draw attention to the fact that in this case the reliability and, therefore, the validity was not ensured. An unambiguous knowledge of all the elements needed to obtain IPMA level D certification will be obtained in the context of the IMPA CZ recommendation by a candidate within the discharge of one of several accredited educational

programs available within the Czech Republic. As reported in recent statistics [5], accredited educational organizations have already trained seventy-three percent of the candidates for certification, and these candidates have been more successful in certification. Accredited educational programs include: ACSA, Academic Learning Activities Center, Bohemia Training Institute s.r.o., HM Partners s.r.o., Institute of Lifelong Learning of Mendel University in Brno, LBMS, s.r.o., PM Consulting, s.r.o., SHINE Consulting, s.r.o., Brno University of Technology, Faculty of Information Technology, Brno University of Technology, Faculty of Business Administration.

Presented paper can be beneficial not only for other universities or other educational institutions that can use the acquired knowledge as inspiration or recommendation in compiling the curriculum of Project Management, both in content and formal. However, since similar work has not been found regarding the curriculum documentation of universities with a focus on project management teaching, this work can be understood as an initial insight into the subject, which can be followed by further research work. Follow-up work may consist, for example, of an analysis of curriculum documents focusing on the teaching of specific areas of project management, thus forming a more detailed description of the content structure of the course. Or, other follow-up work can focus, for example, on the applicability of graduates with knowledge of project management in different areas of the national economy.

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The Role of Fiscal Considerations in Business Capital Structure: Evidence from Innovative Start-ups

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Abstract

A central debate in public policy finance is the role of fiscal considerations in companies' capital structure. In a fiscal system allowing interest-expenses deductibility, the disparity in the tax treatment of equity and debt could affect financing choices. In order to solve welfare losses, public action should intervene by aligning the fiscal treatment of debt and equity, achieving tax neutrality. Otherwise, public action can be designed in order to affect financing choices indirectly, increasing companies' attractiveness for new outsider investors. An example of such policies is provided by the Italian *Growth Decree*, which introduced fiscal incentives for individuals or legal entities investing in innovative start-ups. Using data on young Italian companies, this paper investigates if corporate financing choices have been affected, by one side, by the fiscal benefits due to interest expenses deductibility and, by the other side, by the attractiveness of innovative start-ups for outside investors. The empirical results show that companies decrease the level of equity ratio when the marginal tax rate increases; moreover, due to the possibility for outside investors to obtain fiscal saving, innovative start-ups result more incline to prefer equity financing.

1   Introduction

A central debate in public policy is the role of fiscal considerations in companies' capital structure. When interest expenses are tax-deductible, while the same benefit is not allowed to the opportunity cost of equity finance, the disparity in the tax treatment provides an incentive for companies to prefer debt to equity [29, 30].

A wide number of empirical studies analyses the effect of taxes on corporate financing decisions (for through review see [18, 20, 26, 37]). The focal point of the most of the studies in the '80s and '90s was to find an adequate proxy for company-specific tax status. These studies are often based on observed statutory tax rates, usually uniform across firms and constant for long periods, which makes it difficult to find sufficient cross-sectional and time-series variations to identify tax effects. To overcome this weakness of literature, several recent studies proxy the fiscal variable with simulated company-specific marginal tax rates (*MTRs*), in line with [15, 16, 17, 38], and find convincing evidence on the role of taxes on corporate financing choices [19].

If the disparity in the fiscal treatment of equity and debt affects companies' financing choices, welfare losses may arise. In order to solve such losses, public action should intervene by aligning the fiscal treatment of debt and equity, achieving tax neutrality. Otherwise, public action could be designed in order to affect financing choices indirectly, increasing companies' attractiveness for new outsider investors. An example of such policies is provided by the Italian *Growth Decree*, which introduced fiscal incentives for individuals or legal entities investing in innovative start-ups. The policy has been introduced by the Italian government in 2012, with the aim to increase economic growth and employment. The belief that innovation is a key driver for economic growth and competitiveness of national economies is strongly supported by both economic theory and empirical evidence [1, 22, 23, 36]. However, according to economic theory, markets fail to provide the "socially" optimal level of innovation and technological development, making public intervention necessary to rise the social welfare [7].

For long time public intervention has been aimed exclusively at encouraging all the companies to invest in innovative activities, solving market failures generated by innovation (such as knowledge spillovers). During the last years, innovative companies drew the interest of policy makers. Mostly in the European context, several policy interventions have been designed to promote their development, by solving the difficulty in finding the necessary financial support. A common limit for the development of innovative companies is the difficulty to attract outside investors. The difficult screening activity for outsiders associated to the high risk and uncertainty of the outcome could affect the willingness of investors to finance such companies.

Economic literature has long investigated the effectiveness of technology policies to stimulate R&D private expenditure, finding convincing evidence that public R&D policies stimulate private R&D expenditure [2, 4, 10, 35]. On the contrary, to the best of my knowledge, scant empirical evidence exists on the effectiveness of public policies in fostering investments in innovative companies. [11] provides a recent example in such a field. Based on a panel data set of Italian companies covering the years 2010-2014, this paper analyses the effects of the above-mentioned *Growth Decree*. The empirical result show that the fiscal incentives admitted by the Italian fiscal system have been effective in stimulating investments in innovative start-ups. However, the main limit of [11] is the too short observation period of innovative start-ups.

This paper provides further evidence on the role of fiscal considerations on companies' financing choices. In particular, it investigates if companies' capital structure responds to changes in company-specific marginal tax rates, simulated following the Graham-Shevlin methodology. Second, the paper examines how companies' equity ratio reacts when the fiscal system allows fiscal incentives for outside investors.

The contributions to the existing literature are several. First, this paper implements a new identification strategy based on accurate, company-specific marginal tax rates (*MTRs*), used as proxy for the fiscal advantage of debt-financing. Following [6], I develop a microsimulation model using for a sample of Italian companies in the period 2013–2016. The simulated *MTRs* display considerable cross-sectional and time-series variation due to the extremely nonlinear structure of Italian corporate income. Second, the most of the existing literature on corporate capital structure is focused on debt ratio, investigating which are the important factors in determining the optimal leverage of a firm. On the contrary, this paper is focused on the analysis of the determinants of equity ratio. My identification strategy, exploiting the introduction of the *Growth Decree*, allows to investigate whether innovative start-ups are more incline to use equity financing rather than debt, resulting more likely to attract new investments. The fiscal benefits restricted to a well-defined group of companies (i.e. outside investors in innovative start-ups), provides a quasi-natural experiment by which to test my hypothesis empirically.

The empirical analysis provides significant evidence on the role of fiscal considerations on companies' capital structure. It emerges that the higher the marginal tax rate (i.e. the higher the fiscal benefits of debt financing, due to interest expenses deductibility), the lower companies' likelihood to finance through equity. Moreover, the empirical results show that innovative start-ups are more likely to use equity financing, confirming the effectiveness of the *Growth Decree* in making innovative start-ups more attractive for outsider investors.

The remainder of the paper is organized as follows. Section 2 discusses the *Growth Decree*, whereas, section 3 explains the research design and defines the variables used in the empirical analysis. Section 4 describes sample construction and presents data description. The estimations and the results are discussed in section 5. The final section provides some concluding remarks.

2 Institutional background

In the last years, innovative companies gained increasing attention from governments, due to their expected high innovative performance and productivity growth [12, 34].

The development of innovative companies is get more difficult by the difficulty in finding the financial support necessary to help and enhance their growth. From the perspective of investment theory, the high degree of risk and uncertainty associated with their outcome makes

innovative companies different from traditional ones [14, 24]. Adopting new technologies and methodologies, innovative companies are exposed to high risks of failure combined with the possibility of achieving high returns, and for outsiders it is very hard to evaluate which will be the most probable scenario. Innovative companies are often young, and the absence of a track record makes it more difficult to evaluate the probability of being successful. The high risk and uncertainty associated with their outcome makes the screening activity for the outsider investors very difficult [27]. Moreover, the presence of asymmetric information problems makes harder the evaluation of the quality of innovative projects. An innovative company has better information about the likelihood of success and the nature of the contemplated innovation project than potential investors, but it has no incentive to publicize information about the innovative project, in order to maintain its competitive advantage.

The financial requirement and the degree of risk and uncertainty depend on the phase of innovative activity [25]. At the beginning, during the formulation of the innovative project, uncertainty and the risk of failure are very high, but the financial requirement is very low, limited to the expense of the studies of the feasibility of the project. In the start-up phase, the degree of risk and uncertainty is high and huge financial resources are necessary to realize a prototype, to sustain marketing activity and to support the product. The development and growth phase needs great financial resources, but it has a low degree of risk and uncertainty.

The difficult screening activity for outsiders associated to the high risk and uncertainty of the outcome could affect the willingness of investors to finance innovative companies, especially at the beginning of the innovative activity and during the start-up phase. Therefore, public action could intervene to help and enhance the creation and growth of innovative companies, by favouring indirectly investor in innovative companies, for example through the recognition of fiscal incentives. An example in such field comes from the public policy introduced by the Italian Government in 2012, the *Growth Decree* (Law Decree No. 179/2012).

With the aim to foster sustainable growth, technological development and employment, in particular youth employment [Article No. 25], the *Growth Decree* introduced a comprehensive new framework promoting the creation and development of innovative start-ups. The recipients of the policy are private stock companies, not listed on a regulated market, set up no more than 48 months ago and having as exclusive or core business the development, production and commercialization of innovative products or services, with high technological value.

The *Growth Decree* introduced tax incentives for individuals or legal entities investing in innovative start-ups. Taxpayers subject to personal income tax investing in innovative start-ups may benefit from a tax credit equal to 19% of the investment, up to a maximum of € 500,000 for each fiscal year. Companies and other entities subject to corporate income tax (other than innovative start-ups) may benefit from a deduction from the corporate taxable income equal to 20% of the amount invested, up to a maximum of € 1.8m for each fiscal year.

The possibility for innovative start-ups to raise equity capital through equity crowdfunding is admitted. Innovative start-ups could make an open call for funding on a crowdfunding platform, providing a detailed description of their project. Investors make their decision based on the information provided by the innovative start-up. The effective realization of the project is subject to the obtainment of a minimum level of funding necessary for the goodwill. The crowdfunding platform facilitates the transaction by providing a standardized investment contract and settling the payments [8]. Equity crowdfunding has not been designed to replace traditional capital raising instruments, but rather is a complementary instrument aimed at providing funding for innovative and promising entrepreneurial projects.

3   Research design

The main purpose of this paper is to verify if Italian young companies confirm the existence of an interaction between fiscal considerations and companies' financing choices. First, this study investigates if companies' capital structure responds to changes in company-specific

marginal tax rates. Second, it examines how companies' equity ratio reacts when the fiscal system allows fiscal incentives for outside investors. The baseline specification is the following:

$$Equity\ Ratio_{it} = \alpha + \beta MTR_{it} + \gamma d_{it} + \varphi X_{it} + \varepsilon_{it} \qquad (1)$$

where $Equity\ Ratio$ is defined as the equity expressed as a proportion of total liabilities. The principal control variables are the marginal tax rate (MTR) and the dummy identifying innovative start-ups (d). MTR is the marginal tax rate computed developing a microsimulation model following the Graham-Shevlin methodology. The parameter β is expected to be negative and significantly linked to financing choice: the higher the marginal tax rate (i.e. the higher the fiscal saving due to interest expenses deductibility) the lower the equity ratio. Another parameter of interest is γ, which captures the difference in equity value between innovative start-ups and traditional young companies. A positive and significant coefficient implies that, innovative start-ups are more inclined to use equity financing, compared to traditional companies, confirming the effective of the *Growth Decree* in making innovative start-ups more attractive for outsider investors.

The vector X contains several factors identified by the theories of capital structure as significant variables in affecting companies' financing decisions. The pecking-order theory sustains, for example, that a company's profitability has a negative effect on the choice to use debt financing [32, 33]. By the other side, the trade-off theory predicts a positive relationship between profitability and debt financing: profitable companies usually face high tax rates and, therefore, they should use more debt, lowering the level of equity financing [18]. In addition, the trade-off theory sustains a greater use of debt by larger and more tangible companies [9]. Experience a period of financial distress could influence companies' financing choices: a company with a high probability of bankruptcy should be less inclined to use debt [5, 21, 28]. Therefore, I control for profitability, tangibility, size and bankruptcy probability. Profitability is defined as the ratio of net income (profit/loss) for the fiscal year expressed as a proportion of total assets. Tangibility is the ratio of tangible assets to total assets. Size is the logarithm of a company' total sales. In line with [6], I proxy financial distress using a revised version of the Z-score proposed by Altman [3], given that no listed companies are included in the sample.

4 Sample construction and data description

Sample data has been provided by AIDA data set, which contains balance sheet data of Italian stock companies and provides detailed information about innovative start-ups.

The empirical analysis is based on a panel data set covering the years 2013-2016, composed of Italian companies founded from 01.01.2013 on. Companies founded before 01.01.2013 have been excluded from the sample because only a scant number of innovative start-ups results founded before 2013. This restriction is due to the necessity to base the empirical analysis on a homogeneous sample, composed of young companies, facing the same financing constraints. In contrast to old companies, for the younger ones debt financing could be especially expensive or those companies might not have access to it. Moreover, young companies may have not yet increased their equity base by accumulating earnings [31].

The AIDA data-set includes 350,817 companies founded starting from 01.01.2013 on. In order to obtain a panel data set balanced for year of companies' foundation, companies having missing data for some of the relevant balance sheet numbers have been dropped. Moreover the sample do not include companies having inconsistent data (i.e. negative values of total assets, debt, tangible assets or sales), and companies belonging to financial sectors or to industries having no innovative start-ups. Finally, by excluding outliers (identifies applying Tukey's method [40], based on a boxplot displaying upper extreme values of data set) the final sample has been obtained, consisting of 300,771 firm-year observations for 107,281 companies. Sample construction and composition is presented in Panel A of Table 1.

The group of innovative start-ups is composed of 2,143 companies and 5,593 firm-year observations. Among the innovative start-ups, only 256 have balance sheet data available for 2013 fiscal year (i.e. companies founded in 2013). The number of observation for the following

years increases strongly, reaching the value of 2,143 in 2015. The distribution of profitable companies, shows that on average, 67.82% of sample observation refers to companies paying taxes and having an incentive to use debt financing (due to interest expenses deductibility) in order to benefit from tax savings. The share of profitable companies increased continuously from 2013 to 2016, going from 57.43% to 67.82%.

Panel C of Table 2 provides summary statistics of the variables included in the empirical model. The equity ratio ranges between 0 and 1, reaching a mean value of 0.314. On average, 2% of sample observations come from innovative start-ups. The marginal tax rate ranges from 0 to 27.5% and has a mean value equal to 18.6%.

Table 1: Sample formation and descriptive statistics

Panel A: Sample formation

	All Companies	Innovative Start-ups
Companies founded starting from 01.01.2013	350,817	5,144
Companies having missing data	203,040	2,303
Financial companies	3,227	7
Companies having inconsistent data	28,714	551
Companies in sectors without innovative start-ups	4,368	0
Outliers	4,187	140
Final Sample – Number of Companies	**107,281**	**2,143**
Final Sample – Observations	**300,771**	**5,593**

Panel B: Final Sample and Status of Companies

Fiscal Year	All companies Observations	Innovative start-ups Observations	Share of Total	Profitable companies Observations	Share of Total
2013	24,384	256	1.05%	14,003	57.43%
2014	61,825	1,051	1.7%	40,004	64.71%
2015	107,281	2,143	2%	72,939	67.99%
2016	107,281	2,143	2%	77,040	71.81%
Total	**300,771**	**5,593**	**1.86%**	**203,986**	**67.82%**

Panel C: Descriptive statistics, pooled for year 2010-2014 (171,425 observations)

	Equity ratio	Innovative start-ups	MTR	Profitability	Tangibility	Size	Z-score
Mean	0.314	0.019	0.187	0.034	0.143	2.445	2.107
SD	0.291	0.135	0.128	0.166	0.229	2.326	1.716
Min	0	0	0	-1	0	0	-9.615
Max	1	1	0.275	1	1	11.110	9.998

Note: Panel A shows the sample formation. Panel B shows the yearly distribution of observations, respectively for all companies included in the sample and for innovative start-ups only. Panel C presents the descriptive statistics for all the variables included in the empirical model.
Equity Ratio is the value of equity expressed as proportion of total liabilities; MTR is the company-specific marginal tax rate; Innovative start-ups is the dummy variable identifying innovative start-ups; Profitability is the ratio of net income (profit/loss) expressed as a proportion of total assets; Tangibility is the ratio of tangible assets to total assets; Size is the logarithm of companies' total sales; Z-score is a variant of the Altman's [3] bankruptcy probability.

5   Estimation results

Strong evidence that fiscal considerations affect companies' capital structure has been provided by the empirical analysis performed through ordinary least square estimations, with robust standard errors adjusted for heteroscedasticity.

The first regression has been performed excluding the companies' characteristics from the model and focusing exclusively on the link between equity ratio and fiscal variables. The results (Column 1 of Table 2) show that the marginal tax rate has a significant negative impact on equity ratio, confirming that the higher is the marginal tax saving due to interest expenses deductibility the lower is company's likelihood to finance through debt. By the other side, it emerges that

innovative start-ups have an equity ratio significantly higher than traditional companies. This result confirms the hypothesis that innovative start-ups are more likely to attract new private investments, resulting more incline to use equity financing rather than debt.

When I control for companies' characteristics, the estimation results (Column 2 of Table 2) confirm strongly the predictions of the trade-off theory. First, company's profitability negatively affects the value of equity financing, confirming that more profitable companies are more likely to prefer debt financing. Second, the results show that the higher is the companies' size, the lower is the use of equity financing, confirming that larger companies are more likely to increase debt financing [17]. Third, it emerges that the use of equity financing is negatively linked to the value of tangible assets: companies having higher tangible assets display a higher propensity to use debt financing, because these assets can be used as collateral in a debt contract and they are promptly marketable in the case of short-notice liquidation (see, for example, [5]). Finally, contrary to expectations, I find that companies having higher bankruptcy probability (a lower Z-score) are less likely to finance through equity.

To control for common business cycle effects I add to control variables yearly dummies (Column 3 of Table 2); to take into account possible sectorial differences in financing choices, I add sectorial dummies (Column 4 of Table 2); to account for both these effects I insert both yearly and sectorial dummies (Column 5 of Table 2). The inclusion of yearly and sectorial dummies does not change the main results: the estimated coefficients for innovative start-ups are still positive in all the regressions and highly statistically significant. The strongly negative effect of the fiscal variable on equity financing persists after the inclusion of additional dummies.

Considered that the value of the dependent variable is only observed when it is greater than zero, a truncated estimation procedure is used to test the robustness of the OLS estimations. The empirical results (Column 6 of Table 2) confirm that fiscal considerations affect significantly companies' financing decisions. The MTR keeps its negative effect on equity ratio, such as the dummy for innovative start-ups keeps its positive effect.

Table 2: Estimation results

	(1)	(2)	(3)	(4)	(5)	(6)
MTR	-0.290***	-0.348***	-0.337***	-0.344***	-0.332***	-1.806***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.014)
Innovative start-ups	0.116***	0.100***	0.105***	0.062***	0.067***	0.140***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)
Profitability		-0.093***	-0.105***	-0.101***	-0.115***	-0.034*
		(0.005)	(0.005)	(0.005)	(0.005)	(0.012)
Tangibility		-0.090***	-0.082***	-0.113	-0.106	-0.095***
		(0.003)	(0.003)	(0.003)	(0.003)	(0.007)
Size		-0.048***	-0.046***	-0.047***	-0.044***	-0.140***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Z-score		0.066***	0.067***	0.066***	0.068***	0.197***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Yearly dummies	NO	NO	YES	NO	YES	YES
Sectorial dummies	NO	NO	NO	YES	YES	YES
Observations	300,771	300,771	300,771	300,771	300,771	300,771
Innovative start-ups (observations)	5,593	5,593	5,593	5,593	5,593	5,593

Note: Columns (1) – (5) have been estimated using the pooled OLS Estimator; column (6) has been estimated using the truncated regression. The dependent variable is Equity Ratio, the share of equity to total liabilities; MTR is the company-specific marginal tax rate; the dummy Innovative start-ups identifies innovative start-ups; Profitability is the ratio of net income expressed as a proportion of total assets; Tangibility is the ratio of tangible assets to total assets; Size is the logarithm of companies' total sales; Z-score measures bankruptcy probability [3]. Column (1) controls exclusively for the effect of fiscal variables; in (2) I add companies' characteristics; in (3) I control for yearly dummies; in (4) I control for sectorial dummies; in (5) and (6) I control for yearly and sectorial dummies. Superscript asterisks indicate statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*).

6 Conclusions

This paper provides convincing evidence that fiscal considerations affect companies' capital structure. In line with the theory of corporate finance, which predicts that taxes could affect companies' capital structure, the empirical analysis shows that, due to interest expenses deductibility, companies prefer debt to equity financing. Accurate company-specific marginal tax rates proxy for the fiscal advantage of debt-financing.

Moreover, this paper tests the effects of the Italian *Growth Decree*, which introduced fiscal incentives for individuals or legal entities investing in innovative start-ups. The empirical results show that innovative start-ups are more likely to prefer equity finance, confirming the effectiveness of the public action in affecting companies' financing choices indirectly, making innovative start-ups more attractive for outsider investors.

Acknowledgements

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The Nostalgianomics of Living Preferences:
Where Would You Like to Live?

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Abstract

In this paper, we argue that a counter-balance is needed to metropolises, especially in small European countries. Rural areas and small towns are necessary and must remain economically viable from the point of view of public administration. The objective of the paper is to investigate the concept of nostalgianomics from the point of view of living preference in Slovakia. Using a new measurement scheme, we analysed the preferences of where people would like to live with a sample of almost 500 individuals and introduce a new term of nostalgianomics – a concept that nostalgic sentiment can be used as an economic and creative force as an incentive for investment and housing. In this paper, we focus especially on the area of living preferences and urban planning. Among the methods employed are questionnaire survey and basic statistical analysis. The main findings indicate that Slovaks prefer to live in smaller municipalities and in areas outside of large metropolitan areas – the attraction is driven by a nostalgic sentiment.

1   Introduction

Around the world, cities have grown to mega-proportions with currently 512 cities having a population of over 1 million. It would seem that concentrated agglomeration is an economic necessity and a continuation of the urban evolution based on Marshall's concept of proximity reducing transport cost [13]. Firstly, firms need to locate near suppliers or customers to save shipping costs; secondly, clustering of like-minded businesses help to stimulate innovation within a specific field; and finally the intellectual spill over helps create new businesses, thus adding to the agglomeration. As such, in modern society, agglomeration becomes economic destiny with all other territories relegated to insignificance or whose only purpose is focused on the primary sector and basic commodity production.

Giannone research on American cities has found that regional convergence, where poorer areas become wealthier, began to stall in the 1980s. She attributed this to a skills based technical changes giving an advantage to agglomerated areas, thus smaller towns and villages will continue to suffer [8].

Even though there is an accumulative advantage to size, the will of the individual needs to be considered. Giddens [10] asserts that each individual is continuously in search for his own life narrative in which living space plays an important role. He states "A person's identity is not to be found in behaviour, nor - important though as this is - in the reactions of others, but in the capacity to keep a particular narrative going." He refers to this as the "ongoing 'story' about the self." Individuals strive to complete their 'life story' by choosing options that will leave them with a respectable legacy that can be expressed in terms of both material attainment and societal status. The rural counter-parts to the urban centre must also be able to provide this important narrative.

City planning and design firm Sasaki Associates [17] conducted a survey with 1,000 respondents in six "progressive" American cities. They found that city dwellers are drawn to admiration of historic buildings (58%) and find their fondest memories in outdoor setting such

as a park or on the street (65%). In a paradox, however, 58% of the respondents use their cars most frequently for transportation and 41% complained of traffic and 23% for lack of parking. Like it or not, cars are a dominant feature of city living and an antithesis for the creative city. This survey suggests that cities have a shortage of more historic and humanistic markers that define us as a society. As such, the city is a great place for opportunity but it is also a place that is cold and brutal; hence, many individuals seek to find their refuge in the suburbs and exurbs that surround the city core. It suggests difficulties for the more marginalized people in obtaining the higher goals.

It also ignores some basic realities for Europe. A decline in population is leading to a hollowing out of the countryside, causing depopulation in large areas of many countries, especially in Central Europe. Work that can be described as "computer gazing" can be performed from anywhere and calls into question the need for a mass gathering in a city centre on a daily basis. Dumont [5] states that because of the high density of population and activities, large urban areas also suffer from diseconomies of scale: higher property prices, time lost in transports, etc. This begs the question: is there now a viable alternative to agglomerated living and is this the only true model going forward?

Small towns and their idyllic settings are looked upon nostalgically, but are forgotten in the grand scheme of economic progress. A German study [6] shows that city regions are growing, in Central and Eastern Europe (CEE) as well yet half of Europeans live in shrinking mostly rural regions. Even with the above-mentioned problems, the siren song of mass agglomeration as economic necessity continues unabated, especially due to the preferred concepts of modernity and its focus on future economic progress. To add a needed antithesis to this view, we introduce a concept of nostalgianomics and its focus on individuals and their historical identity. This sentiment could be used as a solution to the problem of depopulation of more rural areas.

1.1 Nostalgianomics versus Modernity in Terms of Living Preference

In a pure neoclassic concept, cost would dictate that as one area becomes too expensive or too inconvenient to live in, people would migrate to a more inexpensive locations looking for better opportunities and a different style of life. Spatially, this rebalancing does exist outside of metropolitan areas, where cheaper suburbs and exurbs spring up to meet the demands for appropriate living space. An even more profound cost advantage would be to move further afield, to the less populated rural areas outside of the influence of a metropolitan area. The cost advantage of the rural area needs to be viewed from both an economic and social point of view.

The urban area is the experimental ground for new concepts in modernity and economic progress often necessitated by its growth. CEE nations under the auspice of a command economy focused myopically on the future with their profound adherence to high modernity – a concept with strong confidence in scientific and technological progress; a reliance on experts (scientists, engineers, and bureaucrats); an attempt to master nature to meet human needs; spatial ordering (city planning, housing, and transportation); and a general disregard for historical, geographical, and social context in development [18]. The result was a cityscape of concrete and cold-grey tedium. This was especially true for the larger cities of Central Europe where blocks of flats (so-called "paneláky") visually dominate the living areas and neighbourhoods of a city.

The post-cold-war period saw a change in CEE countries from high modernity to a unique form of post-modernity. This new form of modernism can be described as a hyper-technological version of modernism [1]. The unenviable position of having to play catch-up to western countries led to a more distinct worship of technological-led post-modernism. In terms of geographical development, the urban centres become the launching point for this new modernity, especially the capital city often at the expense of their rural counterpart [3].

Modernity, and especially high-modernity, disregards the past, overlooking the historical markers that gives us our identity. This historical desire could be described as a state of nostalgia – a sentimentality for a past time or place associated with happiness. In terms of demographic spatial relationship, the small town is rooted in nostalgia and urban centres in

modernity. Our focus is on how nostalgic sentiment can influence the living preferences of people, i.e. how nostalgia can "beat" modernity.

Batcho [2] found that even though nostalgia can be triggered by negative stressors in the environment, it could result in successful development of methods for coping, planning, and implementing strategies for a more positive outcome. Zhou et al. [21] found that nostalgia leads to a sense of social support and connections and a way to cope with loneliness. In a study by Vess et al. [20], subjects who thought of nostalgic memories had better coping mechanisms than subjects whose thoughts were of exciting future experiences. Nostalgia has a place in modern society and as such, we feel the need to establish the term nostalgianomics as a behavioural influence with living preferences.

Nostalgia has an advantage over modernity in that historical markers are forever open to reinterpretation. As individuals engage in nostalgic sentiment, a choice-supportive bias will find the positive in the past while minimizing the negatives. This means that an investor looking for a nostalgic connection might be willing to overlook negative aspects of that choice, even when there is little economic advantage. Nostalgia can have a fatalistic flaw if it holds too ideologically to past concepts that are unlikely to return, i.e. the exclusion of innovation.

Moreover, the smaller towns and village have a unique form of bonding with a social capital based on strong relations with family, friends and neighbours that feature a high level of loyalty, homogeneity and trust. Communities with a strong local institutional infrastructure allowing local people to interact with each other help build bridges to social capital [19]. When viewing social capital that outside of mere economic considerations, it is the smaller community that could have an advantage with a well-organized and established local support system.

Giddens [10] suggests that we live in an era of disembeddedness of time and space, where individuals no longer need to be in physical presence with each other in order to interact in what he refers to as time-space distanciation. Modern information and communication technology is continuously allowing for the untethering of work to a specific location. This makes alternatives to urban, suburban, and exurban living possible. One of the "attractions" of living outside metropoles can be nostalgia.

A nostalgic sentiment is in short supply in the metropolitan centre but can be found in abundance in the rural region, e.g. the non-economic social institutions. This presents a competitive advantage based on the abundance of nostalgic elements found in rural areas and small towns. Authors [11, 14, 15] insist that regional competitive advantage needs to include not only "hard" productivity but also take into consideration "softer" dimensions of the social economy. When applying the softer dimensions to regional development, it is the specific feature, attraction or uniqueness which has a certain value for customers/consumers in a region (residents, tourists, businessmen, and investors), and these customers prefer this value over the offerings of competing regions [4]. For the more rural setting, the competitive advantages are "soft resources" (landscape, historical, cultural heritage). These soft resources can be utilized by the small town community for the nostalgic sentiment they embody.

In our research, we wanted to investigate the concept of nostalgianomics from the point of view of living preference by focusing on a country where the notion of modernity (represented by cities) are in stark contrast to nostalgic sentiment (represented by smaller towns). Slovakia, the focus of our research, contains two larger cities on opposite ends of the country. The capital city, Bratislava, plays the role of governmental, financial, and gateway centre to the rest of the country. In addition, with two major car companies located within the commuter zone, it also plays host to automobile manufacturing. As such, Bratislava has 11% of the population and a GDP that is 2.4 times the national average [6]. Add to this, the near convergence of the Trnava and Nitra commuter zone, you have a population containing almost a fifth of the country (fig. 1). Slovakia can only claim to have one metropolitan area as its other cities are considered to be medium and small urban areas. Still, 63% of the population live outside these urban commuter zones [16].
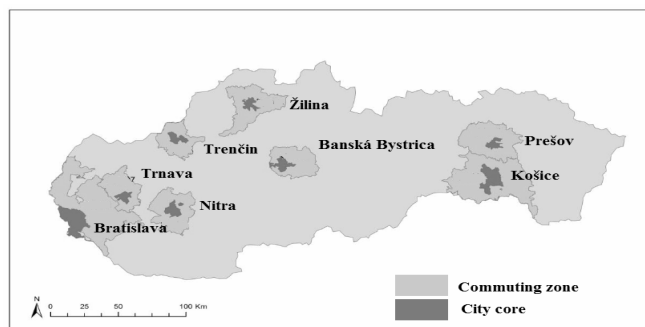
The cost burden of proximity to urban or even suburban living creates a need to limit one's tangible assets (cars, home size, yards, etc.) due to affordability. If economic benefits of living were measured through tangible accumulation rather than the intangible experiences of city life, then rural communities could be seen as having a higher utility.

2   Methodology for gauging living preferences

Slovakia, because of the aforementioned conditions, presents us with a unique condition for the study of living preferences and thus fulfil the objective of the paper, which is to investigate the concept of nostalgianomics from the point of view of living preference. To gauge the preference for living conditions, we have engaged a method of a survey distributed widely through social media and through mass e-mail, i.e. there was no sample selection, we spread the link on the questionnaire and by the snow-ball method it was shared among other respondents. The survey was conducted in months September – November 2018, the total number of respondents was 496. The survey is not representative (and as such it is presented in the results), yet it provides interesting insights into this topic. Respondents were asked 1) to rank hand-drawn pictures of streets and 2) historic micro-regions of Slovakia in order to answer our research question: Where would Slovak citizens like to live and how it can be linked to the concept of nostalgianomics?

To get a better idea of living sentiment, we chose to use 6 hand-drawn pictures of street settings together with a graphical representation of location (fig. 2). The choice for hand-drawn illustrations was an attempt to "alienate" the viewer from the reality of what might be felt if the images were actual photos. Creating penned black and white images created the illusions of the reality of living preferences without the emotional involvement of real photos, only indicating sentimental feeling of bucolic villages and smaller municipalities. The respondents were asked to rank all images in terms of preference with a 1st choice, 2nd choice, 3rd choice and so on.

Figure 2: Illustrations used in living preferences

Picture A- A Bratislava street scene with "panelák" - urban setting

Picture B- Suburb setting with new small homes just outside of Bratislava- suburban setting

Picture C- The Smaller cities of Slovakia- smaller urban setting

Picture D- Suburb of smaller Slovak cities- smaller city suburbs

Picture E- Small Slovak Town- Population 10-20 thousands

Picture F- Village living at least 60km from a city.

Source: Illustration by David Cole.

With the second question, we wanted to find out which region of Slovakia holds any special interest to the respondents. The question was how to divide the regions in a logical way. Modern day Slovakia is divided into 8 different regions (kraj) named after the major city of each region. All regions contain too many different varieties to hold any real distinction for the respondents. Likewise, dividing the country based on counties (okres) would be too unwieldy as there are 79 counties to choose from. To form a more recognizable region, we used an old historical map of Slovakia with 25 distinct regions each with a historical cultural (*nostalgic*) identity. The respondents were asked to choose and rank the top 6 regions they found to be most interesting for them. As the data set for 25 areas is too large and nebulous, we grouped the regions together to form 8 relatively homogenous regions (fig. 3). The combining of areas created some statistical anomalies with calculation such as the Trenčin-Žilina area having 5 combined historical areas and the Schengen border area having only two. The figures should therefore be viewed in qualitative terms rather than absolute numerical terms.
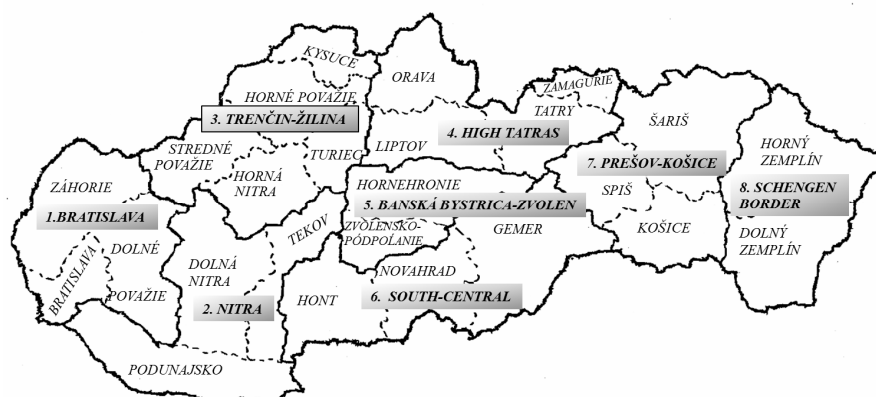
Source: Authors.

3   Results and Discussion

As already mentioned our e-mail listing was rather limited to the local region and did not include as many individuals from Western Slovakia as we would have liked, i.e. from Bratislava. This is a limit of our research, yet the results are interesting and bring new and surprising insights. In tab. 1, the results can be seen by age and preferences with a scale between 1 (low favourability) to 6 (high favourability).

Table 1: Ranked preference of living space according to the pictures and location

Age	# of response	**A** Bratislava Urban	**B** Bratislava Suburban	**C** Regional cities of SK	**D** Regional cities/suburb	**E** Towns- pop. 10-20k	**F** Villages
under 20	35	1.74	3.14	3.83	4.31	4.00	3.97
20-30	270	1.80	3.14	3.82	4.39	4.09	3.86
30-40	69	2.06	3.09	3.99	4.67	3.86	3.48
40-50	57	1.75	2.93	3.93	4.88	3.75	3.67
Over 50	47	1.43	2.85	3.81	4.81	4.13	3.98
Tot. avg.	**478**	**1.79**	**3.08**	**3.86**	**4.52**	**4.01**	**3.80**
# response in each area		43	12	160	57	69	154

Source: Authors.

The results are rather consistent across all age groups. The highest utility can be found in the suburbs of regional cities, followed by towns, then villages. Bratislava and its surrounding commuter zone are much less popular. It is interesting that the younger generation is not so eager to go to the big cities and they have a high affinity to the small towns and villages, i.e. the nostalgic sentiment can be noted also at the younger generation.

We also asked the respondents which picture closely resembles the place where they lived, i.e. about which pictures they feel nostalgic the most. If the respondent stated that their current place of residence was either their first or second choice of living, we could state that they were generally happy about their current living situation (results in tab. 2). Again, the area around Bratislava has low favourability, yet villages score highly. Suburb living around a regional city (in Slovakia, this means a population between 70 and 80 thousand) are also seen as having the highest utility.

Table 2: Satisfaction with current place of residence

Respondents who voted 1st/2nd place in their current residence	**A** Bratislava Urban	**B** Bratislava Suburban	**C** Regional cities of SK	**D** Regional cities/suburb	**E** Towns-pop. 10-20k	**F** Villages
	43%	54%	66%	79%	66%	76%

Source: Authors.

In the second question, the 8 aggregated areas of the country found the mountainous area of Slovakia to be the most interesting which is what was expected as these areas could be considered the playground regions of Slovakia (tab. 3). The economic regions of the country (Bratislava, Nitra – see Fig. 1) ranked quite low. 455 respondents identified were they were currently living. Of these individuals, the High Tatra and Prešov Košice regional had the highest ranked satisfaction as judge by the voting of 1st or 2nd place for their own areas. Nitra is the current economic hot spot of Slovakia with Amazon and Land-Rover Jaguar setting up shop in this region; however, it has the lowest score of interest (10%).

Table 3: Ranked preference of areas of the country found to be most interesting (on a scale of 0 to 6)

	Bratislava	Nitra	Trenčin-Žilina	High-Tatras	Banská B. Zvolen	SC Slovakia	Prešov-Košice	Schengen Border
Ranked score	1.75	1.35	3.62	5.89	3.28	1.2	3.41	0.51
# of res. in each area	17	20	77	66	158	50	55	12
Voted 1st/2nd in own area	41%	10%	29%	77%	35%	38%	56%	33%

Source: Authors.

During socialism, small towns of CEE were supported by decree, i.e. all regions had jobs and a purpose under a command system [9]. Despite all of its failures, the communist regime did provide a certain level of social support to smaller towns not found today. After 1989, the ensuing decade of the nineties meant a period of disorganization when local firms lost old customers and even if they found new customers, they lost old suppliers [12]. This period lasted longer than expected and led to the notion that continuous decline is inevitable. As such, there is a reflexive response of futility towards development in small towns and regions outside of a commuter zone thus overlooking potential opportunities based on nostalgic sentiment. Despite this long period of economic decline, this survey demonstrates a desire to live (or to stay) in the rural towns and villages that is not being reflected in current economic thought.

4 Conclusion

This research contained 496 responses and had some limitations especially with regional distribution, regional variation, and age distribution. Though it is not thoroughly conclusive, it could be viewed as a snapshot highlighting some important motivations in terms of living preferences in Slovakia. In general, we can say that the respondents had a preference for less crowded and less urban settings, mostly driven by nostalgic sentiment. It is a common thought that young people would jump at the chance to leave a "dead-end town" that has little in the ways of excitement. This research indicates that this is not necessarily the case as small towns score highly also among those under the age of 30.

From our research, we have found a strong desire for smaller community living arrangements that extend even down to the level of village living. As much of CEE urban areas were built under a high-modernity philosophical mindset (e.g. large blocks of flats), the towns and villages retain a more historical atmosphere, with detached homes and historical buildings. As such, we established a term for nostalgic influence - nostalgianomics. In the urban, core, historic preservation has gained high importance as new construction cannot mimic the style of the past. Unfortunately, in the rural settings, many historic structures are allowed to rot. These towns and their existing structure have an emotional appeal that could be used for rural

revitalization which is further object of our current VEGA research project (V-18-101-07-101312: Abandoned Slovakia: Effective solutions to the creative reuse of abandoned properties in non-urban areas).

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Administrative Fragmentation and Productivity of Firms. Case Study: Slovakia

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Abstract

The administrative structure of Slovakia belongs to the most fragmented in Europe. Several scholars argue that administrative fragmentation leads to weak institutional environment and therefore retards economic development on local level. The aim of our paper is to find out whether the fragmented administration structure in Slovak functional economic regions has an impact on productivity of firms based in these regions. To prove the assumption, we use regression model and try to explain the change of firm productivity across FURs by indicators on the FUR structure. First, we calculate the productivity of firms (TFPR – total factor productivity of revenue) based on data of almost all enterprises in Slovakia. To describe the structure of FUR we use indicators such as administration effectiveness, fragmentation rate, concentration of population in the core and the share of built-up area as a proxy for infrastructure. These are based on data on local government units aggregated to FUR. The results show, that the indicators on the inner structure of FUR (in the manner of settlements) do not significantly affect the productivity of firms located in the region. Indicators, that do are those on politico-administrative structure (effectiveness of local government units and fragmentation rate) and infrastructure (the share of built-up area).

1 Introduction

The impact of the fragmented administrative structure was in Slovakia mostly examined in the context of the quality of public service provision and did not go beyond the boundaries of individual local governments. In the meantime, however, more scholars are dealing with the impact of governance and the structure of government in a wider socio-economic context.

High fragmentation causes, according to Charbit [7], gaps hindering cooperation. These are: "administrative gap – "mismatch" between functional areas and administrative boundaries, information gap – asymmetries of information between different stakeholders, policy gap – sectoral fragmentation across ministries and agencies, capacity gap – insufficient scientific, technical, infrastructural capacity of local actors, funding gap – unstable or insufficient revenues undermining effective implementation of responsibilities at subnational level or for crossing policies, objective gap – different rationalities creating obstacles for adopting convergent targets and accountability gap – difficulty to ensure the transparency of practices across different constituencies" [7; p.16] . All these gaps do significantly affect the quality of government.

Ahrend et. al [1] deal in their paper with the impact of governance on local productivity. The object of their research was FURs of several OECD member states – Germany, Mexico, Spain, United Kingdom and United States of America. Their finding is a significant role of horizontal fragmentation of administrative structure on the regional productivity.

Growth in the productivity of cities, based on their size, has been proven, e.g. by Combes et al. [5; p.2570], who claims that "there are substantial productivity benefits for all firms in denser areas that are even stronger for more productive firms". On the other hand, Frick and Rodríguez-Pose [10; p.165] state, that "there is considerable heterogeneity across the world in the relationship between urban concentration and economic growth, which is, to a large extent, a consequence of contextual factors that have little to do with urban concentration". In their older

paper, do Frick and Rodríguez-Pose [9; p.16] claim that: "larger cities, albeit not the very large metropolis, can indeed be drivers of growth, but only if the context is favourable". And that is, where the question of quality of government again appears. Its impact on regional economic performance has been studied by Crescenzi, R., Di Cataldo, M. and Rodríguez-Pose, A. [6]. They have found out, that the impact of investments in other than large infrastructural projects has a highly significant connection with regional economic performance if is interacted with government quality.

In our paper, we would therefore like to take a closer look at the impact of fragmentation of the administration structure in Slovak functional economic regions on the productivity of firms based in these regions

2 Material and Methods

In order to evaluate the effect of fragmentation of FURs (in terms of spatial and politico-administrative aspects of FUR) on firm-level outcomes (TFPR - Total factor productivity of revenue and labour productivity), we combine two rich datasets.

2.1 Data

To overcome the problem with lack of data on governance quality, we a proxy indicator – the effectiveness of local governments. The index is based on structure of expenditures of local governments. Data on municipal expenditures of Slovak communes in year 2017 comes from the DataCentre of Ministry of Finance of the Slovak Republic. The data were delivered in the COFOG classification. The sample includes all communes of Slovakia. In the case of Bratislava and Košice the original data about expenditures of city districts and the municipal level were aggregated.

The firm-level data comes from the Registry of Financial Statements and is supplemented by data from analytical company Finstat s.r.o. The data covers almost all firms in Slovakia and encompasses information from balance sheets as well as profit and loss statements. Furthermore, we are also able to identify other non-financial characteristics such as size category, legal form or seat of the firm headquarters. It is crucial to mention that we do not have data on plant localization but only on firm's seat. In case of Slovakia it is common for firms to have firm seat different than the localization of its plants. This fact however presents a major drawback for our analysis. Even if we have detailed micro data on firm seats, we cannot say with 100 % reliability that certain firm operates in the same city or county. We thus cannot precisely match firm productivity with local area conditions as in some cases we might pair two completely unrelated variables. If this is true, then the procedure would create serious measurement error problems and strongly bias our results. We discuss this issue further in the paper and as we believe, we provide adequate and satisfying solution.

2.2 Methods

Total factor productivity of revenue

Our empirical strategy to assess the impact of local government structure and geography on firm productivity is twofold. First, we estimate firm TFPR using control function approach developed by Levinsohn and Petrin [12] . In production function estimation literature, the major obstacle for consistently estimating TFP(R) is correlation between unobserved productivity shocks and input levels. As Petrin, Poi and Levinsohn [15] state, profit-maximizing firms respond to positive productivity shocks by expanding output, which requires additional inputs. Negative shocks lead firms to pare back output, decreasing their input usage. When true, ordinary least squares (OLS) estimates of production functions are biased and, by implication, lead to biased estimates of productivity. Various methods have been proposed to tackle such simultaneity issue and, according to their approaches, is possible to group them in three families: Fixed Effects (FE), Instrumental Variables (IV) and Control Function (CF) [13]. We use the CF approach and

rely on intermediate inputs as a proxy for unobserved productivity shocks (the benefits of using Levinsohn-Petrin approach are described in Petrin, Poi and Levinsohn [15]).

We use data on sales, value added, intermediate consumption, capital, personnel costs and number of employees to calculate nominal TFP - revenue total factor productivity (TFPR) - and labour productivity. To have economically meaningful estimates, we restrict our analysis to firms with more than one employee and also drop firms with zero output. Slovak firm environment is very specific and large fraction of companies are micro firms with zero or one employees. Many of these firms are "zombie" firms or solely created for tax purposes. Therefore, excluding them from estimations is desirable in order to overcome downward productivity bias. Public sector, finance and real estate companies are also excluded. For the purpose of the analysis, sectors are defined at 3-digit NACE Rev. 2 level. In the case of TFPR estimation we are very conservative and sectors with less than 100 observations are not taken into account. By dropping these sectors, we want to achieve precise estimates of input elasticities and not to worry about sample size issues.

We work with three-factor log-linear Cobb-Douglass production function (capital, labour, intermediate inputs) as for example in Dias et al. [8]. We apply the Levinsohn-Petrin approach to a robust panel of more than 1 million firm-year observations covering the period of 2004 – 2016 and calculate desired nominal productivities. The fact that we do not deflate and do not estimate real TFP stems from recent research developed by Atkin, Khandelwal and Osman [2]. They argue that real TFP (TFPQ) performs poorly in productivity measurements because of variation in product specifications across firms. They incorporate quality metrics in productivity estimations and show that as quality productivity is negatively correlated with TFPQ, TFPR may perform better at capturing capabilities in settings where better firms make products with more demanding specifications. Our TFPR regressions are performed sector by sector (performing production function estimates sector by sector allows us to estimate sector specific input/output elasticities and distinguish among different technologies used by firms in different sectors. We consider 3-digit NACE Rev. 2 level to be suitable disaggregation because 2-digit levels are too broad to capture specific elasticities, meanwhile in the 4-digit we drop significant number of sectors which is not desirable) as follows:

$$(1) \qquad Y_{sit} = \alpha_{sit} + \beta_1 Capital_{sit} + \beta_2 Labour_{sit} + \beta_3 InterComp_{sit} + \tau_t + \vartheta_{sit} + \varepsilon_{sit}$$

where Y_{sit} represents log of firm gross output (sales) , $Labour_{sit}$ stands for log of personnel costs, $InterComp_{sit}$ stands for log of intermediate inputs. We also incorporate year fixed effects τ_t. Term ε_{sit} is the idiosyncratic error and ϑ_{sit} represents the unobserved productivity. Subscripts s, i, t stand for sector, firm and year respectively. Three remarks must be made here. Firstly, for capital we use total tangible assets from the balance sheets. We do not incorporate intangibles as we use them as an explanatory variable in the second part of the empirical analysis. Secondly, we use personnel costs rather that number of employees. By doing so we control for differences in worker skills and education. Firms operating with higher share of highly educated individuals should be more productive and this fact then must be reflected in more expensive labour input. Simple metric of number of employees would not differentiate between quality of human capital. Intermediate inputs are calculated as the sum of purchased merchandise, goods and services and energy costs.

After the production function estimations are performed, we continue with the second part of our empirical analysis. We calculate TFPR for every firm in every year and every sector. We also calculate yearly TFPR growth rates (as differences in log TFPRs). Using data on nominal value added and number of employees we calculate labour productivity. These three variables then represent our main dependent variables that we relate to our regressors of interest and various firm specific controls. We follow OECD [11] approach and high-dimensional fixed effects cross section estimation to assess the impact of local geographic and public sector conditions on firm-level productivities. Since our main explanatory variables are only available for one year, we use data on productivity levels and growth rates from the last available year, which is 2016 (to account for proper panel data setting and control for unobserved heterogeneity is desired and will be the aim of further research. We are left with 120 thousand firm observations). We build on Gal [11] and relate firm TFPR growth to the growth of the so called "productivity

frontier" in the Neo-Schumpeterian framework (catch-up-to-frontier setting). Following OECD [11] our catch-up-to-frontier regressions are set up as follows:

(2) $\Delta TFPR_{i,2016-2015}$
$$= \gamma_i + \theta_1 \Delta Frontier_{s,2016-2015} + \theta_2 Distance_{i,2015} + \theta_3 Local_i + \theta_4 Size_i + \delta_c + \varphi_s + \mu_i$$

where $\Delta TFPR_{i,2016-2015}$ stands for firm's i TFPR growth between 2016 and 2015, $\Delta Frontier_{s,2016-2015}$ defines TFPR growth of the sector frontier which is calculated as the average TFPR growth rate of TOP 10 % firms of sector productivity distribution, $Distance_{i,2015}$ represents the lagged TFPR distance of firm i from the frontier. Frontier is defined as average TFPR of top 10% firms in each sector. As in OECD [11] the coefficient of the frontier firm's growth is expected to be positive, reflecting technological pass-through from the frontier, and the coefficient of the distance from the frontier is expected to be negative, reflecting the fact that as a firm gets closer to the frontier, the speed of catching-up slows down. Our main coefficient of interest will be θ_3 which captures the effect of local geographic and public sector conditions on firm TFPR and labour productivity. $Size_i$ represents dummy variable whether a firm is small (<50 employees), medium (>50 and <250 employees) or large (>250 employees). δ_c and φ_s represent county and sector fixed effects. μ_i is a standard error term. To alleviate endogeneity concerns between firms in top decile of productivity distribution and its mean, the regressions are performed for firms in 1st to 9th decile of the distribution. By looking at the growth rates we search for local factors that have positive or negative impact on firm performance evolution in time. Given our results we will able to tell which conditions are more favourable in supporting productivity growth and evaluate a dynamic nature of our estimations.

We enhance the analysis also by estimating the impact of our regressors of interest on productivity levels. In addition to dynamic analysis of TFPR growth rates we add static analysis of levels to investigate the productivity and local conditions nexus in more detail. In order to do so we run a cross section regression with rich set of fixed effects to control for various causes of unobserved heterogeneity. The regressions are specified accordingly:

(3) $Y_i = a_i + \phi_1 Local_i + \phi_2 X_i + \phi_3 Size_i + \delta_c + \varphi_s + \omega_i + \zeta_i$

where Y_i represents either TFPR of a firm i or log of labour productivity. $Local_i$ will capture the same variables as in the equation (2). Vector of control variables X_i includes plausible determinants of firm level productivity such as share of intangible assets in total assets, mark ups, human capital (share of blue-collar workers in total firm employment) and a dummy indicating whether a firm participated in active labour market policy program. The last variable is very interesting since it should be associated with better allocation and training of workforce and thus positively related to firm productivity. ω_i stands for ownership dummy. The reason why we include ownership dummies is country specific. As shown in Výškrabka [17], foreign ownership indicator can explain significant part of productivity differences among firms in Slovakia. Muzikářová [14] shows that foreign firms are on average 30-50% more productive than domestic ones and this relationship holds for controlling for additional firm characteristics and sector fixed effects. ζ_i is a standard error term.

Before we turn to the results we must return to localization and company headquarters problem. As it was mentioned, from our data we cannot determine plant localization but only company seat. Another specific feature of Slovak firm landscape is that significant fraction of firms (32 %) set their seat in Bratislava region mainly because of two reasons. First is that Bratislava as a capital city is a natural economic hub and establishing company seat there is related to significant economic and legal benefits (adequate supply of business services and infrastructure, proximity to major state offices, better business networks and so on). Also, many large corporations (many of them MNCs) have plants distributed across the whole country but their seat located in Bratislava. The second reason is more "practical" in a sense that the more firms registered in Bratislava the lower probability of tax control. These two Slovak business "features" cause disproportional fraction of firms have their seats established in Bratislava region. Therefore, by dropping all such firms we greatly reduce the bias that might come from this type of matching error. Even if other firms have their seats localized in different cities, it might still be the same county and thus there is a large probability that they will be matched correctly with functional urban regions which are the main units of our analysis (all but one

variable are calculated at this geographical level). Thus, overcoming the seat/plant issue by this way we match our local conditions variables to firms using a unique municipality identifier common to both firms and variables in FUR database. By dropping Bratislava region and micro firms as discussed earlier we end up with 50 thousand observations from which we are able to match 91% to the FUR dataset.

Functional urban regions

We aggregated all Slovak communes into functional urban regions defined by Bezák [3] as model "FMR 01-A". Using this model, the number of observations decreased from 2927 communes to 50 FURs. We consider this approach to be the best choice in the context of larger socio-economic entities, because the model presented by Bezák [3] fits by its definition and construction to functional urban areas (in Slovak conditions). They also are in accordance with the recommendations of The Council of Europe (2016).

In the next step, we aggregated the spending of local governments in COFOG classification on the FUR level and then calculated the aggregated effectiveness of FUR's governments.

The effectiveness is measured by the formula:

$$effectivenes\ (\%) = \left(1 - \frac{COFOG\ 01.1.1\ executive\ and\ legislative\ bodies\ spending}{total\ spending}\right) \times 100 \tag{4}$$

As factors, which could have an impact on the composition of public services we have used 4 following indicators.

$$share\ of\ built-up\ area\ in\ FURs = \frac{built-up\ area\ in\ km^2}{total\ area\ in\ km^2} \tag{5}$$

$$index\ of\ dissimilarity_{population} = \frac{1}{2}\sum_{i=1}^{N}\left|\frac{a_i}{A} - \frac{b_i}{B}\right| \tag{6}$$

$$rate\ of\ fragmentation\ in\ FURs = \frac{1}{number\ of\ local\ governments} \tag{7}$$

$$rate\ of\ concentration\ in\ core\ of\ FURs = \frac{populaton\ living\ in\ FUR\ cores}{total\ population\ of\ core} \tag{8}$$

We are aware that the cross-sectional nature of our data might not capture some important time-varying features of the relationship between firm productivity and regional characteristics. Thus, it would be desirable to construct longitudinal (panel) data in order to capture the effect of time-varying factors in conjunction with richer set of fixed effects. This is of course an objective for future research. Another concern may arise from the fact that by dropping only firms with seat in Bratislava region, we do not completely mitigate the effect of incorrect geographical matching of firms to the variables of interest. We believe that firms in wholesale/retail, utilities or HR agencies might not conduct business in counties where they have seats. Also, firms with more than 500 employees may have multiple establishments located across the country. In future research we plan to correct for these issues.

The results can be distorted by the spatial definition of FURs, which is based on Slovak census 2001. Considering the dynamic economic development of Slovakia in the period from the acquisition of data for the creation of our chosen model of FURs (based on daily commuters to regional centres), there has probably been a shift in FURs' borders. Territory of FURs with larger towns and cities and built-in infrastructure should gain. FURs located at their borders and those lying outside major development axes could shrink.

3 Results and Discussion

Turning now to results we document that municipality effectiveness, FUR fragmentation and infrastructure coverage are correlated with our productivity measures. Looking firstly at catching-up-to-frontier regression framework (Table 1) we show that frontier growth pass-through and distance to frontier are statistically significant and have desired directions. Switching to variables of interest we show that 10 percentage points increase in municipality effectiveness leads to 0.3 % increase in TFPR growth rate (local government effectiveness has unconditional mean of 81.5 % and standard deviation of 14.6 percentage points). Higher effectiveness of local governments means that they can allocate more of their budgets to goods and services of a developmental nature. More effective local governments, thanks to development spending, represent a better place to live what makes them more attractive for workers and thus for business.

Table 1: Catching-up-to-frontier framework, dependent variable id TFPR growth rate*

VARIABLES	(1) TFPR growth	(2) TFPR growth	(3) TFPR growth	(4) TFPR growth	(5) TFPR growth
LocGov. effectiveness	0.0311*** (0.0120)				
TFPR frontier (delta)	0.951*** (0.0173)	0.950*** (0.0181)	0.950*** (0.0181)	0.951*** (0.0181)	0.950*** (0.0182)
Frontier distance (-1)	-0.445*** (0.0118)	-0.441*** (0.0127)	-0.442*** (0.0127)	-0.442*** (0.0127)	-0.442*** (0.0127)
Core concentration		-0.00318 (0.0139)			
Fragmentation			0.256* (0.137)		
Index of dissim.				-0.0277 (0.0206)	
Infrastructure					0.291*** (0.108)
Constant	-0.405*** (0.0175)	-0.374*** (0.0153)	-0.381*** (0.0147)	-0.362*** (0.0176)	-0.391*** (0.0157)
Observations	45,400	41,389	41,389	41,389	41,389
R-squared	0.292	0.290	0.290	0.290	0.290
Sector FE	YES	YES	YES	YES	YES
Size	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Authors.
* Infrastructure and municipality effectiveness effects are robust under an alternative specification that uses the same additional regulatory impact indicator as in OECD (2013). See Annex for results table.

Higher concentration of population and businesses in one place creates a precondition for healthy competition both on the labour market and on the product market. This means that people in such places can pay higher amounts for goods and services produced in such places, and on the other hand, higher competition among firms forces them to make better use of production factors.

Also, less fragmented and higher density build-up areas (*infrastructure*) are more conductive to boost productivity growth.

Lower FUR fragmentation means that there are fewer administrative units in the territory and hence fewer borders and fewer larger markets than in more fragmented FURs. Less administrative units mean fewer political stakeholders to communicate with when doing business. Although the general conditions for doing business within FURs and the whole of Slovakia are the same, administrative boundaries cause market fragmentation. This makes it

impossible to achieve significant economies of scale and puts pressure on the protectionist behaviour of political leaders, especially of small administrative units.

The greater part of the built-up area in the territory of the FUR indirectly refers to the concentration of the population and therefore the qualitative change of the territory. Population concentration brings both, a change in the structure of demand for goods and services and creates space for production of new services. Along with this, there is a significant stratification of the society either from the level of education or specialisation. From the point of view of companies, the population's concentration means generally sufficient amount of workforce. Both in terms of education or specialization (e.g. hospitals, universities, science and research, consultancy companies, advertising), and in terms of quantity (medium and large enterprises). This means that in case of population (labour) concentration, goods and services can be produced that would otherwise not be produced - whether highly specialized products and services (high added value), production with intensive use of production factors, in particular labour and capital (economies of scale), or a combination of these.

The core concentration is the FUR's centre population share on all FUR inhabitants. We assumed that the productivity of production factors in FURs with a higher population concentration in the core will be, based on the arguments mentioned above, higher than in the FURs, where the population is more dispersed. However, this assumption has not been confirmed. Similarly, the index of dissimilarity was statistical not significant. This indicator, similar to the core concentration indicator, represented the FUR settlement structure. The assumed relation to the productivity of the production factors lies in the settlement structure of the FUR. As in the previous case, the dissimilarity index was statistically not significant.

Table 2: Pooled specification and county FE

VARIABLES	(1) TFPR growth	(2) TFPR growth
TFPR frontier (delta)	0.951***	0.951***
	(0.0182)	(0.0175)
Frontier distance (-1)	-0.442***	-0.447***
	(0.0127)	(0.0118)
Infrastructure	0.283**	
	(0.113)	
Index of dissim.	-0.00506	
	(0.0356)	
Fragmentation	0.243	
	(0.160)	
Core concentration	-0.000947	
	(0.0229)	
Municip. effectiveness	0.0222	0.0204
	(0.0166)	(0.0156)
Constant	-0.412***	
	(0.0262)	
Observations	41,376	45,400
R-squared	0.290	0.294
Sector FE	YES	YES
Size	YES	YES
County FE		YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors.

This means that the internal structure of the FUR (the settlement structure) does not affect the productivity of factors. But other factors – administrative fragmentation and effectiveness of local governments as political-administrative factors and share of the built-up area as a proxy for concentration of population and related infrastructure are statistically significant.

Controlling for county fixed effects and using pooled specification (Table 2) where we add all local conditions variables (FUR variables + municipality effectiveness) together in one estimation shows that share of the build-up area (proxy for infrastructure development) remains positively correlated with TFPR growth rate.

Moving to static productivity level estimations we show again (Table 3) that local public sector and geographic conditions indeed have significant effect on firm productivity. Municipalities devoting more spending to development activities such as infrastructure construction, education or social services create more favourable economic environment for businesses. In econometric words, 10 percentage point increase in municipality effectiveness leads to 0.75 % increase in firm TFPR. Also, FUR characteristics such as lower fragmentation and high share of build-up area boost productivity as well. The arguments are same as above.

Table 3: TFPR level regressions

VARIABLES	(1) TFPR	(2) TFPR	(3) TFPR	(4) TFPR	(5) TFPR	(6) TFPR
Municip. effectiveness	0.0754***					0.0921***
	(0.00819)					(0.0113)
Intangibles share	0.0661	0.109**	0.108**	0.109**	0.106**	0.0348
	(0.0588)	(0.0479)	(0.0480)	(0.0480)	(0.0476)	(0.0778)
Mark up	0.775***	0.774***	0.774***	0.774***	0.774***	0.803***
	(0.00547)	(0.00568)	(0.00568)	(0.00568)	(0.00568)	(0.00719)
Human capital	-0.0352***	-0.0334***	-0.0330***	-0.0329***	-0.0335***	-0.0471***
	(0.00439)	(0.00466)	(0.00466)	(0.00466)	(0.00465)	(0.00539)
ALMP	0.0600***	0.0576***	0.0580***	0.0575***	0.0615***	0.0638***
	(0.00352)	(0.00362)	(0.00362)	(0.00361)	(0.00363)	(0.00360)
Core concentration		-0.00572				
		(0.00981)				
Fragmentation			0.292***			
			(0.0961)			
Index of dissim.				-0.0519***		
				(0.0144)		
Infrastructure					0.799***	
					(0.0736)	
Constant	2.413***	2.473***	2.466***	2.494***	2.415***	
	(0.0363)	(0.0369)	(0.0368)	(0.0360)	(0.0302)	
Observations	49,004	44,704	44,704	44,704	44,704	37,473
R-squared	0.944	0.944	0.944	0.944	0.944	0.947
Sector FE	YES	YES	YES	YES	YES	YES
Size	YES	YES	YES	YES	YES	YES
Ownership	YES	YES	YES	YES	YES	YES
County FE						YES
R2_a						0.753

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors.

Our results are consistent with those of Combes et al. [5] and Ahrend et al. [1]. Combes et al. [5] say that companies are more productive in areas with more dense employment and at the same time, they say there are benefits of big cities in increasing productivity growth in there located firms in about half of the industries surveyed. The most productive firms experience also the strongest productivity gains. Combes et al. [5] calculated that firms in more densely populated areas were on average 9.7% more productive than firms in less populated areas, with productivity gain ranging from 4.8% for firms from the first quartile to 14.4% for firms from the last quartile. Ahrend et al. [1] found that a 10% increase in city population yields a productivity gain of 0.2. - 0.5%. If the number of administrative units increases by 10% in a given metropolitan region, it is associated with an approximate 0.6% lower productivity.

Our result, the 0.75% increase in firms' productivity observed in case, that the effectiveness increases by 10%, reflects both the above-mentioned results: municipalities effectiveness increases with their size - Combes et al. [5]; and the lower FUR fragmentation rate contributes to productivity growth - Ahrend et al. [1].

4 Conclusion

Our results have shown that administrative fragmentation of FURs has negative impact on productivity of firms. Our findings state, that the fragmented structure of local governments does not affect only the citizens living there, but also firms in their broader neighbourhood. With this, the debate on communal reform in Slovakia gets new arguments. The impact of cities (concentration) on productivity growth, as presented in the literature review, has also been confirmed. Surprisingly, it was found that the FUR internal structure (without taking the geographical factors into account) and the size of the FUR centre had no significant impact on productivity of firms.

Further research can follow two directions. The first offers a greater scope for research in the topic of firm productivity in individual FURs. More detailed information on firm productivity could be helpful in the FUR specialization and tailored place-based policies. Industry-specific research could help identify declining industries and FURs which are threatened by their decline and at the same time identify future "super-star" sectors that will require the attention of decision makers. Attention should also be paid to a closer analysis of the productivity growth in individual FURs. Which FURs grew faster, which are stagnating or declining? Are regional differences increasing or decreasing?

The second direction of the research focuses on a more detailed analysis of the spatial relations of individual settlement elements and the finding of a pattern in their arrangement in relation to the FUR's centre and the communes in the surrounding area. This knowledge can contribute to a better design of "place-based" policies.

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Value Preferences of Employees Working in the Non-profit Sector

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Abstract

The success and effectiveness of non-profit organizations cannot simply be expressed through traditional indicators based primarily on profit, because their evaluation is not primarily based on the amount of generated profit. Missions of non-profit organizations are completed and developed through their staff and the values they share. The aim of this study was to map the value preferences of employees of a selected non-profit organization, to identify both their motivation for work in the non-profit sector in terms of the composition of their value ladder and to what extent they identify with the organization. The degree of identification with the organization can be one of the key means to positively influence the effectiveness and success of the organization. The data was obtained from a questionnaire survey based on the Schwartz's Portrait Value Questionnaire extended by a graphical scale and additional questions mapping the degree of identification with the organization. The data were further corrected by converting them into comparable values and statistically analyzed based on the calculation of mean values and the Pearson correlation coefficient. Determination of the employees' value setting and their degree of identification with the organization could become a tool to detect another factor that may cause conflicts in the organization and have a negative impact on its functioning and consequently its success.

1 Introduction

The non-profit sector is an integral part of the economy not only in the Czech Republic but also elsewhere in the world. It can be understood as an institutional response to the failures of the state and the market which, in an economic sense, brings about the increase of social wealth and involves the redistribution of financial resources and mobilization of human resources [7]. At the same time, certain non-profit-making tasks are entrusted to the non-profit sector, e.g. social welfare and humanitarian and development assistance. The type, size and focus of non-profit organizations are very diverse. They should, however, meet five basic characteristics: organized structure, institutional separation from public administration, non-distribution of profit, self-management and volunteering [21].

There are many ways to measure the success of an organization in the for-profit sector. For the non-profit sector, however, traditional indicators based primarily on profit cannot be used. The main purpose of non-profit organizations is other than maximizing profits and meeting a profit-oriented business plan. The success of non-profit organizations must, therefore, be expressed in a different way and it is a question what, in their case, should be considered as relevant indicators of success. If, however, at least partial meeting of their strategic goals and completion of their mission can be deemed an achievement of a non-profit organization, then human resources, both employees and unpaid workers (volunteers and members), are one of the key elements to achieve them [23].

Human resources indicators are an important part of the assessment, even within a broader concept of success of non-profit organizations where the narrow concept of success of a non-profit organization (achievement of objectives and fulfillment of the mission) is extended by performance, efficiency, competitiveness, etc. Such indicators include, for example, qualification

and initiative of workers [19], employee turnover [12] or indicators evaluating job satisfaction of paid and unpaid workers [25].

The aim of the study was to map the value preferences of employees working in the non-profit sector, to identify both their motivation for work in a non-profit organization in terms of the composition of their value ladder and to what extent they identify with the organization. And it is the degree of identification with the organization that, in our opinion, is one of the key means that may positively influence the effectiveness and success rate of the organization.

Identification with an organization can be understood as a deep acceptance of the organizational identity [1]. It is an unstable, time-varying construct [27], [17], [11]; members interpret the current orientation of the organizational identity through understanding the organization's activities and the feedback from its surroundings [4]. For many, the organizational identity can have an even greater significance than the identity based on gender, age or nationality [14], because it can fulfill their desire to accentuate their own excellence. This can be done by identifying with the organization that, as compared to others, the individual considers to be non-fungible [10]. If this happens, the individual experiences a sense of work satisfaction, engagement and loyalty to the organization, etc. [16]. This intrinsic unity between the individual and the organization is really essential. If the individual accepts the organizational identity as their own, then they act in the interest of the organization with the best of intentions [1], which is related to their internal work motivation, level of collaboration in the workplace, job satisfaction, their performance etc. [10].

Identification with the organization can also be understood as getting identified with a group of people who pursue a common goal, and individuals perceive themselves as "we" within this group. Through the process of depersonalization, they emphasize the similarity they share with other members of the organization and pay special attention to what they have in common [6]. At the same time, however, the individual creates their own understanding of the organization based on their own experience and makes up their own view of it that may not be in line with how the organization presents itself in terms of its identity [13]. It can also be understood as the degree of alignment between how the individual perceives the organization in terms of identity and what they expect [9].

Various aspects of looking at the motives that lead to identification with the organization can be found in reference literature (based on the theory of social identity and the related processes of self-categorization distinguishing individual, relational, and collective identities [6], [10], or from the viewpoint of social and social-emotional reasons [1]), but the aim of this study is to measure the level of identification with the organization in the context of its members' value ladder. According to Salancik and Pfeffer, the individual is satisfied at work and motivated to work if their job's characteristics are compatible with their needs [22], and we believe that this is also partially based on their value ladder. A practical solution of this is built on Schwartz's theory of values.

Values are relatively stable over time and influence the attitudes, judgments and behavior of all people in general [15] and, in our opinion, values help to shape up the organization's internal operations, internal relationships and the so-called indoor climate of the organization, its image and successful branding of the organization. Although values serve as a mediator in the interaction of an individual with their social environment [5], the individual becomes aware of them only when the received perspective comes into conflict with the values they recognize. Values as guiding principles in the lives of individuals form the basis of human attitudes, that is, the manner in which the individual evaluates experienced events. The individual assesses positively what is in line with the fulfilment of their goals and negatively what threatens them or prevents them from achieving them [20].

Values in an organization express the group's demands on how to achieve them, and the assumptions that may cause conflicts in the organization can include incompatibility of the value systems of individuals and organizations [26]. Although the complex topic of organizational identification cannot be reduced to a single aspect, it is the viewpoint of values and goals shared by the individual and the organization that is also considered as a means of ensuring coherence throughout the organization [18].

Another aim was to verify the accuracy of the universally accepted assumption that people working in non-profit organizations do not tend to build a staggering career which is related to Boer and Fischer's statement that the economic factor does not influence value-based social attitudes [3], and this partly results also from the fact that there are not enough positions in the environment of non-profit organizations to satisfy their potential desire for career growth, and partly from the fact that the financial remuneration is not adequate to the required amount of work and the responsibilities inherent in the position [24].

2 Material and Methods

The data needed to evaluate the issues raised above were obtained from a questionnaire survey based on the Schwartz's Portrait Value Questionnaire and the Schwartz's Value Survey [20]. The questionnaire investigated the value orientation of executives and ordinary employees of a selected non-profit organization operating in the area of humanitarian aid and social care.

The obtained data were corrected through a conversion into comparable values according to the Schwartz's recommendation by subtracting the average value calculated through all the respondents' answers from the answer to each question and further analyzed by calculation of the mean values (mean) and the Pearson correlation coefficient. The perceived content of the organizational identity and the degree of similarity between the values of members of the organization and the declared value system of the organization were evaluated.

Table 1: Demographic variables

Total	105	100%
Men	6	5.71%
Women	99	94.29%
Employees	40	38.10%
employees/ members	61	58.10%
Others	4	3.81%
ordinary employees	54	51.43%
Managers	48	45.71%
Others	3	2.86%
less than 1 year in the org.	13	12.38%
1-3 years	18	17.14%
more than 3 years	74	70.48%
administrative workers	54	51.43%
health and social workers	45	42.86%
Others	6	5.71%
up to 30 years	7	6.67%
31-50 years	65	61.90%
51 years and older	33	31.43%
primary education	2	1.90%
high school education	76	72.38%
university education	27	25.72%

Source: Authors.

The questionnaire was sent to respondents via the organization's internal email system at the end of 2018. A total of 579 employees were contacted. They were executive and administrative staff members of the organization's headquarters, managers and administrative staff of the regional branches of the organization, and staff in services provided by the regional branches of the organization. The research sample was established by negative self-selection (part of the addressed employees did not participate in the research and did not fill in the

questionnaire), the questionnaire was filled in and sent back by 106 respondents, so the survey was carried out with 18.3% return rate. One of the submitted questionnaires was excluded from the analysis because the respondent did not meet the basic condition of the employment relationship. Table 1 shows statistics broken down by demographic variables (gender, membership in the organization beyond the employment relationship, job position, length of work in the organization, job classification, age and education).

Respondents answered each question in the questionnaire by judging the values with 2 items on a six-point scale (1 – it is absolutely not me, 2 – it is very unlike me, 3 – it is rather unlike me, 4 – it is rather like me, 5 – it is very much like me, 6 – it is definitely me, and for questions about organizational values 1 – it is absolutely not my organization, 2 – it is very unlike my organization, 3 – it is rather unlike my organization, 4 – it is rather like my organization, 5 – it is very much like my organization, 6 – it is definitely my organization). In addition, an adapted graphical scale of identification was used according to Bergami and Bagozzi [2], to which numerical values (0 - zero identification to 5 - complete identification) were also assigned for further statistical processing, and additional questions according to Fombelle et al. [8] that could also be answered on a six-point scale (1 - absolutely disagree, 2 - very disagree, 3 - rather disagree, 4 - rather agree, 5 - very agree, 6 - totally agree).

3   Results and Discussion

First, a correlation analysis was made between the mean values of the organization and its employees shown in Figure 1. The correlation coefficient was 0.63, there is a certain concordance between the values of the individual and the organization.

In the selected non-profit organization operating in the field of humanitarian aid and social care, the highest importance is given to the values of Benevolence (1.22) and Security (1.08) by its employees. It is, therefore, perceived primarily as an organization that transcends itself and the need for smooth functioning of the group / society, the need to be a part of a larger entity, and the need for helpfulness and for increase of well-being are its determining needs. But also the need for a certain position in the social rankings, a sense of security, harmony and stability in the society and in the organization itself.

The value of Self-Direction (0.19), which is characterized by the need for creativity, independence, curiosity and freedom, ranks last. The value of Stimulation (0.30), i.e. the need for extraordinary stimuli, challenges and excitement ranks penultimate. Both values are antagonistic to the near-leading value of Security according to the Schwartz's motivational continuum.

Figure 1: Correlation of individual values and organization's values
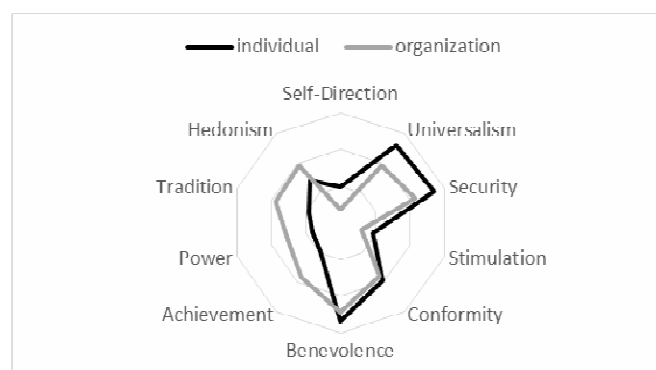
Source: Authors.

Source: Authors.

In terms of demographic variables, perceptions of organization's values are not fundamentally altered, not even in the case of comparison of ordinary employees and managers who are often the faces of the organization in the non-profit sector. The only exception can be found in the category of men, the category of respondents under the age of 30 and the respondents with basic education who perceive the values of Self-Direction and Stimulation as significantly more restrained than others in the organization. Interestingly, men perceive Tradition (0.87) characterized by humility and sensitivity to the expectation of the environment as the most important value in the organization, followed by the value of Universalism (0.78) that could be simply characterized as an effort to understand and protect the well-being of all people, and it is not until after these values that the values of Benevolence and Security (0.70) follow. In the category distinguishing between the employees/members of the organization and mere employees, there is a different perception of Self-Direction which is suppressed for employees, while employees/members have an obviously stronger feeling of doing what they chose.

As far as individual values are concerned, employees in the selected non-profit organization consider on average Security (1.36) to be the most important value, closely followed by the value of Benevolence (1.34) and Universalism (1.30). The value of Power (0.40), i.e. the desire to achieve certain social status and prestige and the need to demonstrate authority and wealth, was the last. The assumption that people working in non-profit organizations are not wired to build a breakthrough career has, therefore, been confirmed on a given sample. The organization's and its employees' value settings are shown in Figure 2.

Based on the results, respondents were further divided according to the declared level of identification with the organization into three basic groups - below-average identified, average identified and above-average identified respondents. The least represented category (1.90%) of below-average respondents reached the correlation with organizational values of 0.32, the value setting of these employees rather does not match the organizational values.

Figure 3: Correlation of the average identified respondents with organization's values
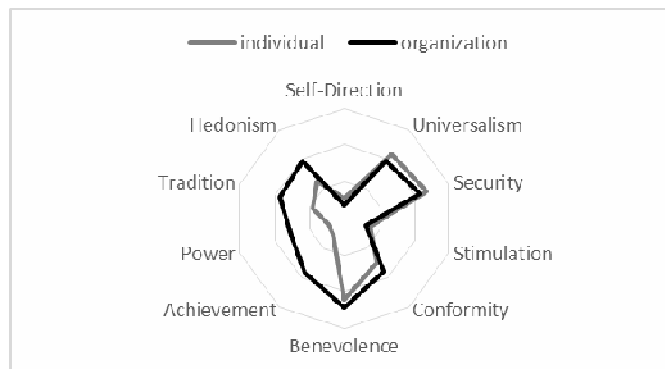
Source: Authors.

The category of average identified respondents (34.0%) reached the correlation rate with the organizational values of 0.71, in which case it can be stated that the value setting of these employees coincides with the values of the organization to a large extent (see Figure 3). A typical representative of the category of the average identified respondents is a woman aged 31 to 50 who has been a regular employee (not a member) of the organization for more than three years, works as a health care or social worker, has high school education related to the work she carries out in the organization and has not considered leaving the organization yet.

The most represented category of above-average identified respondents (69.0%), which, unlike the average identified, mainly includes those employees who work in the administration and are also members of the organization, reached a correlation with the organizational values of 0.59, i.e. rather weaker consonance. This has already been indicated to us by the fact related to the perception of the organization's value setting - there is a different perception of Self-Direction among employees/members within the given sample. In their case, the Self-Direction is perceived as more significant than on the overall average, which points to the fact that these individuals chose to work in the organization deliberately and by doing this work they have a certain sense of autonomy and freedom.

Why the highest consonance has been achieved in the category of the average identified respondents should be subjected to deeper analysis which, in our opinion, will depend on other factors that have not been the focus of this research.

Another question we dealt with in the research was what values that are determining for the operations of the organization and reflect in its publicly declared mission are assigned by both managers and ordinary employees to each of the principles. The values of Benevolence and Universalism, which hide the desire for understanding, protection of the welfare of people and nature, social justice and benevolence placed first and second. Coming in last places are the values of Power and Achievement that represent the desire of social power, dominance over people and resources and achieving success as an expression of personal ambitions. These findings are also in line with the perception of the value setting of the selected organization as well as the individual value setting of its members.

4 Conclusion

The aim of this study was to map the value preferences of employees of a selected non-profit organization operating in the Czech Republic, their perception of the value setting of the organization and the degree of their identification with it. Having applied correlation analysis, we found that there is a congruency between the average values of the organization and the value setting of its employees; the employees are more or less in the line with the organization that is perceived by them as an organization for which helpfulness and increasing of well-being are important. Partial misalignments in perceiving the organization's value setting occur in further subdivided categories of respondents, which can be used by the organization for further targeted work with its human resources. Not only can the organization at least partially understand the motives of their employees' behavior, but it can also influence the potential impact of their continuance in the organization.

In our study, we found a striking congruency with the organization's values in the category of average identified respondents. In our opinion, this phenomenon is not clearly related to the fact that these respondents would project their own value ladder into their perception of the organization, or that they would simply assimilate in the organization's environment, because there was no such significant congruency in the category of above-average identified respondents. It can be assumed that this is a more complex problem affected by many other factors that should become the subject of further research, which could provide answers to questions about the extent to which the degree of identification plays its role in relation to various components of an individual's identity, and what role this fact plays within the organization.

Identifying employees' value orientation and their degree of identification with the organization could, in our opinion, become a tool to reveal one of the factors that may cause conflicts in the organization and, thus, have a negative impact on its functioning and consequently its success.

Apparently, this aspect could make it possible to improve the process of recruitment and selection of employees so as they resonate better with the declared and internally understood values of the organization and are able to understand better the contents of these important values. If the organization's priority values are fundamentally inconsistent with the motivation of its employees, it can hardly be assumed that this will have a positive effect on the achievement of the organization's strategic goals, completion of its mission, efficiency and, thus, the overall success of the organization.

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Public Sector Financial Support for SME Innovativeness: Case Study of Selected CEE countries

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Abstract

The impact of innovation on economic development cannot be underestimated. Innovation has been touted as the anchor on which firms can nick a competitive advantage for themselves. Over the years, public sector interest in innovation has been emphasized due to the impact innovation has made on economic development of some nations. Different public sector support systems are available to firms to access for their innovative activities. Small and Medium Scale Enterprises (SME's) play vital role in the economies of most countries. Despite their contribution to development, they are constrained by inadequate funds to engage in R&D for innovation. In the light of this, the research sought to find out whether the innovativeness of SME's from Selected CEE Countries determines the public financial support from the government or the European Union. The logistic regression model was employed using the harmonized European Union Community Innovation Survey 2012-2014 data for the empirical analysis. Our results indicate that SME's that are engaged in innovative activities attract public financial support from national government and/or the European Union. This is because, the public sector financial support from the government and the EU target firms that are already engaged in innovation or show potential to be innovative.

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1   Introduction

Recently, innovation has had enormous impact on economic development of many countries both developed and developing [19], [3]. More so, due to resource scarcity and the aftermath of the financial Crises saw the European Commission in 2010 emphasizing in its communication to the member states the need to spend efficiently resources on innovation activities. However, businesses cannot propel growth alone due to the inadequacy of resources and market imperfections [11], [4] and lack of capital [14]. This is because, both big and small firms need support from external resources to bolster their internal resource geared towards innovative activities firm whose spillover effect in the long run impact positively on the growth and development of the public economy, but they are financially constrained. Different support systems are available to firms to source for their innovative activities especially from the public sector. [10] have suggested avenues through which the public sector supports firms' innovative activities. They include; cooperation arrangements between firms, and other bodies, Loan from the public banks, tax incentives and direct government funding through policies and projects of the government aimed at stimulating innovation. Such subsidies given to firms have both positive and negative ramifications, i.e. they may complement private financial investment in firms' R&D or block such avenues (crowding out effect). Small and Medium Scale Enterprises play vital role in the economies of most CEE countries. Small firms are necessity for employment creation [2], [16], [15], [7]. Bela et al opine that SMEs play important role in the Czech and Slovak republic [2].

Their activities ensure economic growth due to the fact that they promote competition by their radical introduction of new products to the market [18]. Therefore, public sector support is invariably important if SME's are to be able to engage in innovative activities as a tool of innovation policy. Essential amount of literature has dealt with the impact of public funding on

the firm innovative activities [25], [8], [1] and many others have also concentrated on the analysis of the effects of public policy on R&D activities of the firm. Most developing and developed states support SME's innovative activities through subsidies for firms' R&D against the backdrop that they are sources of innovation. In the same light, the EU has conceived SME's to be the backbone of the EU economy [18]

Hesmati & Loof advance an interesting point about how the public sector support firms in their innovative activities [10]. They concur with the assertion of [13] that many of the literature on public financial support assume all firms have the possibility to receive support from the public support programs. Rather, most of these firms attract and receive financial support due to their activeness in innovative activities or owing to their track record and viability of a novel innovative product and or service. In this case, small firms are less privileged than the big firms to access funds from the public sector. Likewise, highly innovative small and medium-scale enterprises are considered to the less or non-innovative ones. Again, some literature on innovation support by the public sector has concluded that effective public sector financial support helps to induce or stimulate innovation activities among firms. However, this research seeks to show that in most cases, public sector support for innovation is competitive and project base [5]. Thus, the most innovative and viable innovative activities of a firm would be supported. It will also outline the kind of financial support firms attract in the selected countries.

The next section delineates a brief review of literature to illuminate the gap in the support of innovation by the public sector. Section three provides the method employed for the empirical analysis and data used. The findings of the research are discussed in section four and lastly, conclusions and recommendations highlighted.

1.1 Theoretical Background

The underlying reasons for public sector financial support for firms' innovative activities is attributable to market failure which stems from underinvestment in innovative activities and financial constraints. Also, the reason that the public sector must ensure improvement in technology [6] for product and service to the general public also stimulates public financial support. Westmore finds in his investigation of the influence of the public policies on private sector innovation of selected OECD countries that social rate of return on innovative support exceeds the private rate of return [25]. Therefore, governments' intervention in innovative activities is paramount for the realization of social benefits on outcomes of innovation. However, Chudnovsky et al opine that subsidies from public sector are given to government selected projects with high social rate of returns [5]. Subsidies and financial support in general provide firms with the ability to grow therefore as many literatures have argued small and medium-size firms have to be supported for two reasons. First, due to financial constraints, survival of many SME's becomes less because firms are unable to internally generate funds. Secondly, SMEs possess the potential to lead in the economic growth of nations because they account for employment, innovation and capital stock.

Moreover, the historical antecedent of the perspective of the then communist regime in the selected CEE countries must be emphasized. Unlike the communism era where new ideas and research were unidirectional i.e. R&D was the task for a group of research institutes who inter alia controlled the various innovative activities of the firm including intellectual property right and patents, the contemporary neoliberal economic systems of the CEE countries as a result of their EU accession has shifted from the lack of in-house research activities among firms [12] to encompass an innovative ecosystem of many stakeholders and enormous research and collaborative agreements due to effective and efficient innovative policies.

The post-accession to EU has in no doubt strengthened the firm level R&D activities ably supported by both national (government) funds and EU funding through the structural funds as well as other special funds. The EU does not only support firm innovative activities but affect innovation policies in the region as well. Kattel et al has described the integration process CEE economies have been through [12]. The economic restructuring and integration into the global economy meant that the CEE countries took the peripheral approach or rather were dipped into the EU economy at the time. That means most big companies at the communist time without

R&D units had either have to up their game or merge with the then Multi-National Companies who had established their outsourced companies here in the CEE region. Current trends which started a decade ago has seen more innovation activities at different levels in the CEE region. SME innovative activities are prevalent leading to the major economic growth in some countries in the region.

As a matter of fact, Steyerberg et al concur that government subsidies and research grants are provided for firms through application process [23]. Moreover, it is the public sector agency that selects such programs to be funded. Enormous research has been done in this field especially assessing the impact of public sector subsidies and financial support and firm performance. But there exist quite a number of methodological issues as Hyytinen & Toivanen re-echoed in their analysis of SMEs in Finland [11]. Amongst them is the issue of reverse causality and selectivity bias with government funding of innovation at the firm-level [10] on one hand and the nature of data set [8]. They emphasize the endogeneity of firms' innovative activities and funds SME's receive from the government. Klette et al also argue that, researchers in most studies ignore the fact that government deliberately select firms to receive R&D subsidies and this mostly leads to significant bias in the econometric estimates and conclusion [13]. Recent papers have however tried to account for this bias by putting certain dummies such as industry and location dummies to control for this bias. However, one possibility to eliminate this bias is by making the public financial support or subsidy dependent on the innovative activities of the firm and their outcomes while accounting for the propose dummies. The current research employs this methodology to show that firms innovative activities determines the public sector financial support for SME's in selected CEE countries.

Firm level innovation can be measured both in terms of the input and outcomes of innovative activities such as intellectual property rights and so on. However, knowledge capital assets have been used recently. As we will show in the subsequent sections, outcomes of the firm innovation are as a result of firm activities such as firms internal and external R&D, purchase of external knowledge and so on and is mostly used as means to attracting financial support from the public sector. In the light of this assumption, we propose two hypotheses as follows;

H1. SME's that are engaged in innovative activities attract public financial support

H2. Innovative SME's attract financial support from the EU and or National government.

The purpose of this paper is to analyze whether the innovativeness of SME's determine the public sector financial support innovative SME's attract in some selected Central and Eastern European Countries.

2 Methodology and Data Source

The Data for the empirical analysis was sourced from the European Union Community Innovation Survey (CIS) conducted for three years from the period 2012-2014. The CIS data has enormous reference across various fields of innovation hence it widely usage by many authors [21], [17], [22] across the innovation field. The CIS gather data on innovation and innovation activities of firms in the EU using a harmonized survey questionnaire. The data from the CIS provides dichotomous variables which makes analysis of the data possible by using binary logistic regression [21], [24]. Logistic regression is employed for the empirical analysis because it is able to predict the probability of an innovative SME attracting public financial support. Additionally, since the dependent variable (Public Financial Support-PFS) is a binary variable or dichotomous in nature, it fits the model used by predicting the relationship between the dependent and the independent variables. The strength in using the logistic regression model stems from the fact that it is able to provide salient information and make inherent relationship predictions that other binomial models fail to account for. The general formula for logistic regression model is given in the form:

$$PFS = \beta_0 + \beta_1 (Intramural\ R\&D)x + \beta_2 (Extramural\ R\&D)x + \beta_3 (Machine\ Acquisition)x + \beta_4 (External\ knowledge\ acquisition)x + \beta_5 (Training\ for\ innovative\ activities)x + \beta_6 (Innovation\ introduction)x + \beta_7 (Patent\ application)x + \beta_8 (Industrial\ design\ right)x + \beta_9 (License/Sell\ patent)x + \varepsilon_x \quad (1)$$

The formula shows that the propensity for SMEs to attract public financial support from Government and EU is dependent on the innovative activities and innovation outcomes of the firm. The dependent variables denoted by PFS represent FUNGMT/FUNEU and ex denotes the residual error margin, β_0 is the intercept and β_1- β_9 denotes the independent variables. We then run the analysis for both dependent variables and the results are presented by tables 1 and 2 below.

Figure 1: shows the analytical concept for the model
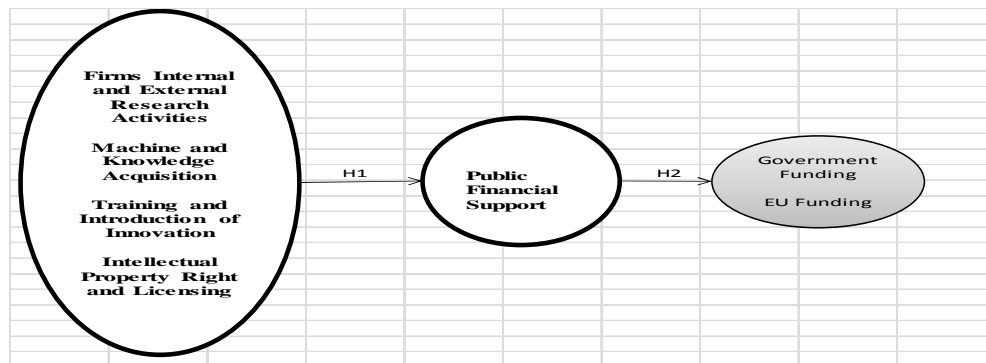
Source: Authors'.

Some CEE countries (Bulgaria, the Czech Republic, Estonia, Croatia, Hungary, Latvia, Lithuania, Romania and Slovakia) were selected for the analysis. These CEE countries were selected because majority of them if not all rely on SMEs as their backbone for economic development. Most of these SMEs are highly innovative and as such have the propensity to expand internationally and ensure competitiveness. Due to this, government and EU (through structural funds) support various activities of these firms to continue in their strides. One key support by these public sectors is financial support. Hence, we seek to analyze which financial support the SME's attract. In the light of this, we propose the conceptual framework as shown in figure 1. The framework illustrates that firm's innovative activities determine public financial support (H_1) and such innovative firms may attract these funds from the public sector or EU funds H_2.

3   Results and Discussion

The empirical results on whether the innovativeness of SME's determine the public sector financial support firms attract in some selected Central and Eastern European countries are presented in the tables 1 and 2. The research considered all SME's that responded to the CIS 2012-2014 innovative questionnaire based on the CIS NACE category regardless of their enterprise group to be able to determine whether innovative SME's funding support come from the EU or the National government.

The effect of government funding of firm's innovativeness has often been said to contain selective bias and reverse causality problem [11]. Most researchers have argued that firm's innovation activities may be endogenous of government funding, i.e. government funds are likely to be given to firms that engage more in research and development for innovation.

From the analysis, we observe that government funding supports innovative SME's in the CEE countries in the firm's internal research and development and Machine acquisition. However, this was not so for firm's external research and development with the exception of Romania and the Slovak Republic which proved to have no effect on attracting government funding. The results complement [9] findings that small and start-up firms have high capital cost. Firm's capital cost involves the purchase of fixed assets such as equipment or machinery which are fundamental for both product and process innovation. Since government sees innovative firms as a source of new ideas and growth, most innovative SME's have the propensity to attract government financial support.

Regarding external knowledge acquisition, innovative SME's in Hungary, Estonia, the Czech Republic, Croatia and Latvia attracted government funding. Only SME's in Estonia attracted government funds for introducing innovation. This evidence can be linked to government policy aimed at supporting innovative capacity building in SME's for engaging in further innovation activities such as the EU Horizon 2020. Also, innovative SME's that applied for patent received funding support from the government except Croatia, Hungary, Lithunia and Slovakia. It has also been shown that only SME's in Bulgaria with industrial design right received support from the government. And lastly, Hungary and the Czech Republic SME's attracted government financial support for licensing or sale of patent.

Table 1: Government Funding for Firms Innovative Activities

	Bulgaria	Czechia	Estonia	Croatia	Hungary	Lithuania	Latvia	Romania	Slovakia
Firm Innovative Activities									
Intramural R&D	2.127 **(0.001)***	2.985 **(0.001)***	1.583 (0.019)**	1.699 (0.030)**	1.672 **(0.001)***	1.773 **(0.001)***	2.364 (0.052) *	4.679 **(0.001)***	3.443 **(0.001)***
Extramural R&D	-0.779 (0.013)**	-0.813 **(0.001)***	-0.182 (0.603)	-1.015 (0.017)**	-0.397 (0.066) *	-0.463 (0.125)	-0.428 (0.495)	0.090 (0.877)	-0.442 (0.329)
Machine Acquisition	3.161 **(0.001)***	1.579 **(0.001)***	1.458 **(0.001)***	4.869 **(0.001)***	3.281 **(0.001)***	2.325 **(0.001)***	1.748 **(0.008)***	1.651 **(0.001)***	2.264 **(0.001)***
Ext. Know Acq.	-0.041 (0.835)	-0.321 (0.097) *	0.795 (0.019)**	-0.639 (0.065) *	0.707 **(0.001)***	0.134 (0.640)	-1.551 (0.096) *	-0.174 (0.673)	-0.253 (0.664)
Training	0.253 (0.116)	0.011 (0.944)	0.804 (0.017)**	0.092 (0.765)	0.210 (0.222)	-0.038 (0.881)	0.762 (0.209)	0.569 (0.419)	0.256 (0.635)
Innovation Intro.	0.098 (0.579)	0.088 (0.566)	-0.313 (0.345)	0.832 **(0.007)***	0.216 (0.236)	0.061 (0.822)	-0.220 (0.729)	1.284 (0.107)	-0.565 (0.336)
Intellectual Property Right									
Patent Applicat.	0.682 **(0.002)***	2.031 **(0.001)***	2.109 **(0.001)***	0.390 (0.524)	0.354 (0.254)	0.166 (0.698)	1.803 (0.010)**	1.932 **(0.001)***	0.843 (0.388)
industrial design right	0.668 (0.041)*	0.500 (0.829)	1.128 (0.368)	0.825 (0.189)	-0.532 (0.352)	-0.630 (0.465)	-15.665 (0.991)	-0.682 (0.482)	-0.886 (0.466)
License or Sell Patent	-0.153 (0.665)	1.316 (0.026)**	-0.575 (0.361)	0.647 (0.475)	1.318 **(0.001)***	0.582 (0.479)	0.517 (0.567)	-14.582 (0.988)	-15.865 (0.990)
N	**13749**	**4193**	**1672**	**1025**	**6195**	**2151**	**1367**	**7143**	**2411**
McFadden R²	**0.287**	**0.329**	**0.326**	**0.431**	**0.407**	**0.208**	**0.277**	**0.521**	**0.355**
Cronbach's α	**0.76**	**0.80**	**0.82**	**0.81**	**0.81**	**0.76**	**0.81**	**0.73**	**0.79**

Source: Authors' own analysis.
Significant values at p<0.5, p<0.01**, p<0.001****

Regarding EU funding for firm's innovative activities, the analysis shows similar trend as the government funding but for Croatia and Estonia, firm's machine acquisition and internal R&D show no effect on firms attracting EU funds. Regarding training for innovative activities and firm's introduction of innovation, the results show the propensity for innovative SME's to attract funds from the EU with the only exception being Bulgaria and Latvia (for introducing innovation) but innovative firms in the Czech Republic and Slovakia show the probability to attract EU funds for introducing innovation and training for innovation activities. Majority of innovative SME's that applied for patent are likely to attract EU funds except for Lithuania and Slovakia. Only Bulgaria and Latvia innovative SME's showed propensity to attract EU funds for industrial design right but for Hungary, sale of patent showed no effect on firm attracting EU funds.

	Bulgaria	Czechia	Estonia	Croatia	Hungary	Lithuania	Latvia	Romania	Slovakia
Firm Innovative Activities									
Intramural R&D	2.007 **(0.001)***	1.275 **(0.001)***	1.164 (0.110)	-2.175 (0.348)	1.187 **(0.001)***	3.402 **(0.001)***	3.020 **(0.001)***	3.859 **(0.001)***	1.885 (0.020)**
Extramural R&D	-0.626 (0.047)*	-0.320 (0.067)*	0.449 (0.197)	1.881 (0.103)	0.093 (0.649)	-0.836 **(0.001)***	-0.778 (0.037)**	0.103 (0.853)	-0.179 (0.702)
Machine Acquisition	3.432 **(0.001)***	2.637 **(0.001)***	0.569 (0.126)	17.845 (0.992)	3.001 **(0.001)***	1.578 **(0.001)***	2.155 **(0.001)***	1.940 **(0.001)***	3.577 **(0.001)***
External Knowledge Acqusition	-0.200 (0.251)	0.082 (0.652)	-0.330 (0.339)	1.042 (0.076)*	0.143 (0.505)	0.105 (0.680)	-1.044 (0.021)**	0.446 (0.282)	0.104 (0.819)
Training	0.707 **(0.001)***	0.107 (0.475)	1.027 **(0.003)***	1.179 (0.120)	-0.016 (0.920)	-0.200 (0.366)	0.906 **(0.005)***	-0.338 (0.670)	-0.095 (0.831)
Innovation Intro.	0.118 (0.446)	0.225 (0.144)	0.899 **(0.006)***	-0.447 (0.473)	0.705 **(0.001)***	0.444 (0.053)*	0.036 (0.917)	1.825 (0.023)**	-0.432 (0.392)
Intellectual Property Right									
Patent App.	0.387 (0.069)*	1.097 **(0.001)***	1.319 **(0.005)***	1.999 (0.031)**	0.741 (0.015)**	0.438 (0.267)	1.606 **(0.001)***	2.287 **(0.001)***	-0.364 (0.758)
industrial design right	1.263 **(0.001)***	2.302 (0.301)	0.469 (0.383)	-0.502 (0.716)	-0.374 (0.457)	0.394 (0.609)	1.175 (0.044)*	-1.432 (0.184)	-0.623 (0.584)
License or Sell Patent	0.391 (0.216)	0.157 (0.779)	-0.781 (0.570)	-19.593 (0.999)	1.177 **(0.002)***	0.530 (0.493)	0.232 (0.676)	-14.805 (0.987)	-0.713 (0.521)
N	**13749**	**4193**	**1672**	**1025**	**6195**	**2151**	**1361**	**7143**	**2411**
McFadden R^2	**0.373**	**0.283**	**0.289**	**0.386**	**0.415**	**0.276**	**0.406**	**0.473**	**0.355**
Cronbach's α	**0.76**	**0.80**	**0.82**	**0.81**	**0.81**	**0.76**	**0.81**	**0.73**	**0.79**

Source: Authors' own analysis.
Significant values at p<0.5, p<0.01**, p<0.001****

4 Conclusion

Innovation as it has been discussed in the numerous literatures above contributes immensely to the economic growth and prosperity of nations. This assumption by far has been highlighted in all policy documents of the EU to which member states have adopted same. Hence innovation and firm's innovation activities cannot be underestimated. The main goal of this paper is to analyze whether firm's innovativeness determines the public financial support innovative SME's attract in some selected CEE countries. Based on the conceptual framework, we deduced that; innovative SME's that are engaged in innovative activities attract government financial support and or EU funds for their innovative activities. As a result of public innovation policies that support SME's which engage in innovative activities, national and EU funds are likely to be awarded SME innovators.

Our result has demonstrated that based on the innovative activities firms engage in, which are measurable per their innovation outcomes achieved, majority of the SME's in CEE countries attract financial support from the central government and or EU. These findings have therefore confirmed our hypotheses H1 and H2. The results corroborate the finding of Un & Montoro-Sanchez [23] that public funding is influenced by firms' propensity to innovate likewise Heshmati and Loof [10] who found public funds to support SMEs in Sweden. North, Smallbone & Vickers [16] also found in the UK that depending on the intensity of the SME in innovation, the firm gets to participate in public sector support programs in Lee Valley region of London.

In the meantime, the analysis provides mixed results regarding public financial support especially regarding EU funds. This is mainly due to the different levels of the innovation

capacity of the selected countries and their propensity to receive financial support. For instance, [19] describe these innovation groups i.e. (innovative capacity and performance) to be moderate, modest and strong innovators in their analysis of some selected CEE countries. In the current 2018 European Innovation Scoreboard, all the selected CEE countries are categorized into either moderate or modest innovators with Bulgaria and Romania well below the EU average. As such, differences exist among states and their funding policies.

The result also shows the robustness of innovation and SME's innovative activities in the CEE countries after the post-EU accession and the economic recession. State financial support is necessary to drive firms to productive ways and innovation has been the key driver. Firms have to perform and survive whilst creating employment for people thereby contributing to economic growth. In the nutshell, we recommend that much attention be giving to the outcomes of these supported innovative activities of SME's in the selected countries since the result showed rather less effect of public financial support on them. Also, cross regional research be done in order to duly ascertain the most efficient SMEs for comparison sake and to show policy direction of public authorities.

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Facebook Practices of the Czech Regional Capitals – Pilot Insights in the Character of the Communication with Citizens

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Abstract

Social media are continuously becoming a new significant tool for public administrations, not only for reaching their communities, but also for getting feedbacks, generating discussions or stimulating other forms of civic participation. From this perspective, the introduction and use of social media in public administration have enabled to intensify and expand this two-way relationship between public administration bodies on a particular level of government and the public or relevant stakeholders. Current practice and previous relevant research show public administration entities use social media with diverse intensity, purpose or strategy. This research is gathering current experience and knowledge concerning this specific issue abroad and with focus on the Czech Republic. The sample contains the data of the Facebook posts of the Czech regional capitals and the aim of the paper is to analyse what type of information local governments publish through its Facebook pages and how public is engaged in the communication.

Keywords: In-depth analysis; descriptive statistics; regional cities; Facebook

1 Introduction

Over the past few decades, public administration and politics have undergone various changes. One of the major was the transformation of communication between public administration entities or politics and citizens caused by the development of new technologies. Especially the internet created and provided completely new space for various interactions between these actors with almost unlimited potential. The transformation of the Web 1.0 (passive, one way of communication) to Web 2.0 (interactive and responsive two-way communication) changed the way of how public administration (PA) entities (for example, municipalities, regions or agencies) can communicate with its citizens or customers (responsive websites, social networks etc.). Since the online space provides various tools for online communication (websites, social networks, mailings etc…), differing among themselves in certain aspects, for the particular research it is better to distinguish between them and focus on each of them separately. Therefore, social networks and their use by public administration entities were chosen to be analysed in this paper.

Using social networks (SNs) as one of the communication tools is an opportunity for local governments to inform its citizens via different channels, providing more space or forms of information transfers between the source of the information and recipient. But SNs can also raise citizens' awareness of the PA institution role and competencies (Špaček 2018) or create two-way communication with their users (e.g. citizens, residents, tourists, NGO, companies etc.). This particular communication tool can be, therefore, used not only to disseminate relevant information (like an official municipal magazine or not well-developed websites) but also to receive feedbacks, opinions and ideas or to raise various discussions and debates more or less sophisticated. This, in fact, can help improve public policies and public services and motivate citizens to actively participate in public matters (Bonsón et al., 2017). However, the use of SNs in the life of a municipality can be far more significant. They can also be used as a nudging tool for a similar effort as previously mentioned, or they can help foster social cohesion of a community (Špačková and Ouředníček 2012). Last but not least, other previous research also revealed the

linking between the use of social media and trust in government (Song and Lee 2015). It confirms our assumption that SNs belongs to the variety of communication tools perceived by citizens as a matter of governmental accountability to them (Picazo-Vela et al. 2012). But indeed, it depends on what and how it is communicated to the audience. Further research could show whether governments use SNs for this purpose (for example, to raise their credibility among its audience) and whether it succeeded or whether they use this specific communication tool to a different purpose (for example, to develop the community life).

Current practice and previous relevant research show public administration entities use social media with various intensity – from a complete absence of activity at the social media to frequent and intensive use, usually associated with higher investments and also following outputs. Although the previous research indicates increasing trends of using SNs by public institutions (cf Mossberger et al., 2013, Bellström et al., 2016), there is still lack of research and knowledge based on empirical evidence on how SNs are adopted and used by these type of institutions (Bonsón et al., 2017). This research is focusing on analysing the mentioned aspects from the perspective of regional cities in the Czech Republic with focus on the use of particular social network (Facebook) as a dominant SN platform used by public administration entities in the Czech Republic. There are also available other similar tools like Twitter or YouTube, but their significance from the perspective of using by Czech public administrations is negligible in comparison with Facebook.

This research is preliminary and is trying to gather what it is currently known about the practice of using SNs by the Czech municipalities from previous research and discuss what the research potential of this issue is considering the possibilities, limits and specifics of SNs. By analysing the posts uploaded by the Czech regional cities, the paper analyses what type of information local governments publish through its Facebook pages, how the public engage in the communication, in terms of what is the type of their engagement and based on when the post is published. Subsequently, the outcomes of our research will be compared with the findings of relevant domestic and international research. The discussion is formulated based on the review of relevant literature and own preliminary research done in this field, that should initiate further and much more in-depth research on this topic, which the authors intend to continue.

2 Data and Methods

The methods used for this paper are interpretative content analysis and descriptive statistics. Research questions and design of this paper was inspired by the previous relevant researches listed in the following table.

Table 1: Research focus of prior literature

Author(s)	Research question
Hoffman et al. (2013)	What kind of government communication behaviour is successful in SN?
Sivarajah et al. (2015)	What is the impact of using Web 2.0 technologies by LGs for internal work?
Bellström et al. (2016)	What type of information does an LG send through its Facebook page? What type of information does an LG receive through its Facebook page? What does the type of information communicated on Facebook reveal about government-citizen communication?
Bonson et al. (2017)	How do LGs in Western Europe use FB as a communication and engagement channel? How are citizens engaging with their LGs by using FB? What factors influence activity levels by LGs and engagement levels by citizens?
DePaula et al. (2018)	To what extent can the Facebook messages in a sample of LG departments be categorized within the typology?

Source: Authors.

For the purpose of the analyses, it was retrieved 838 posts uploaded on Facebook by the Czech regional capitals in April 2018 (Brno - 55; České Budějovice - 112; Hradec Králové - 154; Jihlava - 17; Karlovy Vary - 25; Liberec - 29; Olomouc - 23; Ostrava - 21; Pardubice - 59, Plzeň - 81; Praha - 117; Ústí and Labem - 67 and Zlín - 78). The data were collected from Facebook by using Netvizz. The application is a variable data extractor that provides outputs for different sections of Facebook in standard formats. It enables to extract data of particular profile, except of personal profiles (Rieder, 2013). For each post it may extract data about the content and the form of the post, the date when the post was uploaded or the number of reactions, comments and shares. These variables were used in the analysis. Moreover, the data regarding the number of fans in April were retrieved for each observed Facebook page.

Firstly, the qualitative interpretative content analysis was used to classify the posts based on the purpose of the post and the field of the information provided within. The coding was performed in three steps. In the beginning, the initial list of potential purposes and areas of information covered in the posts were prepared, based on the previous research (Bellström et al., 2016, Bonsón et al., 2015). Then, the list was modified based on the content of the analysed posts. Finally, the sample was re-coded and checked again. The posts were subjected to only one category. If a post could be classified into more than one category, it was classified in the most suitable category.

Secondly, municipalities were split into two groups based on selected criteria (fans per capita, engagement per post, engagement per fan) measuring their basic features according to general goals (scope or activity etc..) from the perspective of social networks or marketing in general. The purpose of this split was to distinguish municipalities according to their successfulness in using SNs for deeper analysis. The regional cities that ware ranked among the three best at least in one of the criteria, were classified as a municipality with the successful use of Facebook (Hradec Králové, Karlovy Vary, Liberec, Praha, Ostrava, Zlín), remaining cities were assigned to the control group (Brno, Jihlava, Olomouc, Pardubice, Plzeň, Ústí and Labem).

Table 2: Ranking of the regional municipalities based on the selected criteria

	1st	2nd	3rd
Fans per capita	Karlovy Vary	Liberec	České Budějovice
Reactions per post	Praha	Karlovy Vary	Ostrava
Reactions per fan	Hradec Králové	Praha	Zlín

Source: Authors.

Thirdly, the descriptive statistics were used to investigate how regional municipalities use SNs and whether and how the engagement (calculated as sum of comments, shares and different type of reactions) and the content differs between the two groups. Moreover, engagement of Facebook users was analysed, based on the content of the uploaded post and based on the time and day when the post was uploaded.

3   Results and Discussion

The content analysis reveals a one-way form of communication prevails on Facebook pages of the Czech regional capitals. This finding is in line with the main outcome of Svidroňová et al. (2018). Based on the analysis of social networks of Slovak regional cities (posts uploaded during February and March 2018), the authors found out that LGs communication on SNs is characterised mainly by ex-ante informing and various competitions associated with funding for some public services, but with very limited calling for more active participation of citizens or followers in decision-making. The main intention of municipalities on SNs is to disseminate information regarding life in the municipality. This finding corresponds with the conclusions of Bonsón et al. (2015), Mossberger et al. (2013) and of Špaček (2018) analysis based on the data of Czech regions using Facebook. If the municipality published posts asking their fans to express

their opinion, mostly the posts were related to the leisure activities and had a form of a contest; the stimulation of civic participation was missing. Similar results were also obtained by Špaček (2018). These findings indicate selected public administration entities are still not capable of benefiting from the opportunities that social networks offer and use them for informing public about issues and events occurring in the regional municipality (public and community issues). Further analysis showed specific differences in LGs performance on SNs and with the use of the control group the difference is also observed. The differences could be identified in terms of what and how is communicated to the users (followers).

Figure 1: Purpose of the PA communication
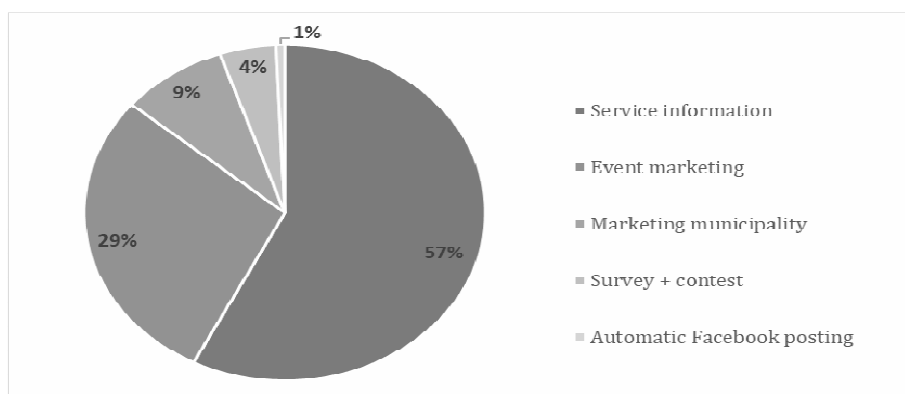
Source: Authors.

Following table 3 shows the differences in post distribution and average engagement (overall and then categorised based on the particular type of engagement) between both groups from the perspective of thematic areas inspired by relevant literature.

Table 3: Differences in characteristics between control group and the rest

Category	Post distribution			Avg. engagement			Avg. number of comments			Avg. number of reactions (like, sad…)	Avg. number of shares
	1	**2**	**TOTAL**	**1**	**2**	**TOTAL**	**1**	**2**	**TOTAL**		
Architecture	0.9%	6.6%	3.0%	97.4	18.0	33.9	22.2	2.1	6.1	27.0	2.0
Commercial services	14.7%	5.0%	11.2%	44.8	17.3	41.0	3.9	0.3	3.4	33.3	4.4
Culture	3.5%	1.0%	2.6%	29.7	20.4	26.2	1.1	1.7	1.3	22.2	2.7
Education	11.2%	11.9%	11.5%	31.7	16.7	24.7	1.3	0.6	1.0	20.6	2.9
Environment	3.0%	4.3%	3.3%	29.2	21.1	26.4	1.5	2.2	1.8	21.9	2.7
Health care	6.2%	5.6%	6.0%	6.5	21.5	14.0	0.0	0.0	0.0	12.5	1.5
History	0.4%	0.7%	0.5%	24.7	40.4	33.7	1.0	2.9	2.1	26.3	5.2
Housing	3.9%	9.3%	5.8%	40.7	23.6	30.0	5.3	2.8	3.8	21.3	5.0
Charity	0.6%	1.7%	1.0%	19.8	29.2	24.1	3.5	0.4	2.1	16.9	5.1
Job offer	1.1%	1.7%	1.3%	12.3		12.3	0.0		0.0	7.8	4.5
Leisure activities/ entertainment	0.7%	0.0%	0.5%	48.8	25.0	39.3	1.4	1.2	1.3	30.0	8.0
Marketing municipality	13.2%	15.9%	14.2%	190.5	25.9	164.2	5.3	1.6	4.7	139.5	20.1
Others	2.4%	2.6%	2.5%	45.9	51.9	48.2	1.8	7.1	3.9	29.3	15.0
Public administration	2.2%	3.6%	2.7%	30.7	13.8	22.6	3.5	3.4	3.4	16.5	2.7
Reconstruction	3.2%	2.6%	3.0%	118.7	46.6	95.6	23.9	6.8	18.4	68.4	8.8
Regional development	2.2%	3.6%	2.7%	35.0	31.9	33.5	8.2	7.0	7.6	23.7	2.2
Safety	3.7%	3.6%	3.7%	57.0	45.5	52.9	8.0	2.5	6.0	16.8	29.0
Sport	10.1%	9.9%	10.0%	38.9	41.5	39.9	3.1	1.5	2.5	29.5	7.7
Technical services	6.0%	1.3%	4.3%	17.4	20.0	17.7	0.9	1.0	0.9	13.3	3.4
Tourism	1.9%	0.0%	1.2%	133.9		133.9	4.4		4.4	104.9	24.6
Transport	8.8%	8.9%	8.8%	68.6	24.5	52.5	18.7	3.4	13.1	29.1	10.3

Source: Authors.

There are no noticeable differences between those groups in terms of post distribution (the most substantial differences can be seen in categories as architecture, commercial services, housing or technical services). However, there are significant differences between the groups in terms of average engagement or the average number of comments which can be caused by a different distribution strategy, the audience with different characteristics, different quality of posted content etc.

Further, our research also confirmed the higher potential of original content (not shared) in terms of raising general awareness (number of reactions and comments). In case the post was original, the average engagement was 59.7, whereas the average engagement of the shared post was 19.8. Slightly surprising could be the finding that posts containing visual feature are significantly more successful in raising the engagement in case of own (original) content (with an average engagement of 61.3) rather than the shared ones (16.7). Unfortunately, the mechanism of the Facebook algorithm is hidden for our eyes. It seems that, perhaps, it prioritises the content generated by the profile owner over the shared content as well as it probably prioritizes the content depending on the day or time it was uploaded on Facebook. However, this assumption must be verified on larger data sets using further techniques because there is still a lot of unknown variables and factors influencing efficiency and success of the SNs communication.Table 3 depicts the average distribution of users' engagement based on the hour (0-24h) and day of the week (Mo-Su) when the post was uploaded. It confirms the assumption that the audience is engaged the most within the weekends (users have more free time at disposal, generally to spend it by leisure activities, social networks including). From the perspective of a day time it seems that most active hours according to the uploading of the posts are during the late afternoons and evenings or within the mornings. More successful (with using the control group and based on the selected criteria) municipalities in terms of higher awareness on SNs focus their communication between 8-10h and 18-20h (time represents, in this case, the time when the post was uploaded) and spread it within the whole week rather than concentrating on publishing their content only on certain days. Contrary to the assumptions the highest probability in reaching high users' engagement is within the weekend (Sa-Su), based on our data and observations. From the perspective of raising the discussion, it seems that there is no significant difference like in engagement discussed above. An ideal timeframe for raising the discussions seems to be afternoon 16-18h.

Table 3: Average distribution of users' engagement

Avg. engagement	Mo	Tu	We	Th	Fr	Sa	Su	Total
0–8	87.0	60.9	55.4	15.6	24.3	14.3	5.0	**34.5**
8–10	51.6	62.5	47.0	44.9	92.3	134.9	46.4	**64.0**
10–12	32.8	14.3	33.0	49.7	25.5	174.4	24.8	**40.0**
12–14	32.1	30.4	43.1	22.4	31.9	19.0	14.5	**31.0**
14–16	41.8	49.9	42.8	55.4	47.2	83.6	40.8	**49.4**
16–18	45.2	32.3	24.4	38.2	79.3	49.6	250.3	**51.2**
18–20	93.5	88.7	136.7	56.7	47.1	113.0	141.7	**102.8**
20–24	19.5	16.0	147.7	99.2	25.5	21.4	25.7	**49.7**
Total	**44.9**	**45.9**	**52.2**	**45.2**	**46.0**	**96.7**	**70.9**	**52.8**

Source: Authors.

4 Conclusion

The analysis shows that municipalities use different communication strategies with users via SNs with different outcomes (in terms of engagement, content, reach etc...). With the use of evidence-based methods, LGs can use SNs more actively (to achieve two-way communication) concerning the principles as accountability, transparency or participation. SNs provide a two-

sided problem to be solved – supply (LGs) and demand (users) - with different kind of methods and approaches that can be used.

The issue of engagement is not purely black and white matter, public administrations profiles including. The purpose and the content of their communication may differ from private companies, which also use this communication tool to do business. But as well as the companies, if governments want to use this tool efficiently to reach their goals (raise credibility, improve service delivery, develop the life in community etc.), they need to:

1. set up a clear strategy of their marketing communication (including the strategy for using their SN profile);
2. understand the needs and behaviour of their audience (Kennedy and Moss 2015), how to build it (able to reach new users), how to maintain and develop it;
3. know how to raise the awareness in tough and very intensive competition with other information providers on SNs (companies, NGOs, users etc.).

Therefore, governments usually must upload a suitable mixture of posts reflecting both their primary mission as well as supplementary activities and initiatives ideally supported with responsive commentary strategy to not only raise awareness but also to raise the engagement in the community. It is, however, the ideal scenario of how to build a community via social network and how to keep it viable according to certain principles and goals. But this whole scenario in general breaks down into many pieces that are affected by different factors, internal and external, including sponsorship. Thus, further research in this area needs to take into account previously mentioned specifics and limits of the research. We would like to follow up on this preliminary research and its findings and continue by further research in this field by verification of preliminary findings on more massive datasets, developing and testing of content typology and in-depth analysis of LG communication via SNs to understand what they communicate to their users and with what efficiency or success.

Acknowledgment

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Competencies and Financing of the City of Bratislava and its Boroughs

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Abstract

The aim of the paper is to analyze selected competencies and their financing in the City of Bratislava and its 17 city boroughs. The representatives of the City of Bratislava and the respective boroughs argue that they receive insufficient funding in terms of central government income tax revenue distribution. Furthermore, according to research, the current system is costly, inefficient and does not deliver the same quality standards of public service provision for all citizens in Bratislava. The article offers suggestions for possible changes in order to decrease the cost and increase efficient use of public finances. Two key solutions are proposed and discussed. First, reduction in the vast number of city borough councillors. Second, using the analysis of selected competencies transferred from the central government to the municipal registry offices and construction offices, the paper provides a comparative perspective and shows the differences in expenditure and efficiency of individual boroughs and their respective offices. The authors identify performance benchmarks among boroughs and discuss the claims of insufficient funding given to construction offices. The authors collected quantitative data which shows contrasting differences in expenditure and efficiency among the 17 boroughs. Based on an analysis of final accounts and other statistical data, the paper presents results that could make public expenditure of Bratislava city boroughs more economic and efficient.

Keywords: local government; competencies; financing; Bratislava; efficiency

JEL Classification: H72

1   Introduction

The city of Bratislava is the capital city and also the most populous city of Slovakia. As the country's capital city, it has some specificities compared to other municipalities in Slovakia – for instance a federal two-tier structure of local self-government which splits Bratislava into 17 separate self-governing boroughs on top of one city level. The authors decided to analyze 2 transferred central government competencies and in particular their financial aspects in all of the 17 Bratislava city boroughs. The paper will examine two of them, namely the registry offices and construction offices. Generally, financial security and funding of registry offices is not questioned by the Bratislava city boroughs and their representatives. By contrast, many of the boroughs argue that central government funding is not sufficient for running their construction offices. The authors decided to choose these two competencies since all 17 Bratislava city boroughs hold construction office powers and 14 city boroughs carry out registry office responsibilities.

The aim of the paper is to analyze selected competencies based on their financing in the city of Bratislava and its 17 city boroughs. The representatives of the city of Bratislava and the respective boroughs argue that they receive insufficient funding in terms of central government income tax revenue distribution. Furthermore, according to research, the current system is costly, inefficient and does not deliver the same quality standards of public service provision for all citizens in Bratislava. The article offers suggestions for possible changes in order to decrease the cost and increase efficient use of public finances. Two key solutions are proposed and discussed. First, reduction in the vast number of city borough councillors. Second, using the analysis of selected competencies transferred from the central government to the municipal registry offices and construction offices, the paper provides a comparative perspective and

shows the differences in expenditure and efficiency of individual boroughs and their respective offices.

1.1 On Bratislava local self-government

The city of Bratislava together with the city of Košice have a special status in the system of territorial self-government in Slovakia. As the number of their inhabitants exceeds 200 thousand, they are obliged to follow special legislation (Act no. 377/1990 on the City of Bratislava; and Act no. 401/1990 on the City of Košice). Another specific feature is that they are the only two cities in the Slovak Republic that have a two-tier local self-government. Apart from the city level, there is also the borough level with 17 self-governing boroughs. [1, 5]

The city-level authority is the city mayor (*primátor*) who is the statutory body of the city, carries out an executive role and represents the city. The other equally important body is the city council which acts as the city's legislative body and collectively decides on the most important questions of the city for the benefit of its citizens. The city-level institution is the city hall or city office (*magistrát*) which is the administrative, organizational and service centre of the city. At the borough level, the statutory authority and executive role is vested in the borough mayor (*starosta*). Borough offices (*miestne úrady*) follow the same structure and logic but operate only at the borough level and carry out different functions to the city office. [4, 10] Hence, citizens of Bratislava are provided the same services by law but they can be performed very differently across the city – both in terms of cost and quality – depending on the borough in which they live. [2]

Individual municipalities carry out self-governing (i.e. original) and delegated (i.e. transferred) powers (i.e. competencies) through elected representatives and employed municipal office staff. Original competencies are financed purely from the local self-government budget and the individual municipalities are solely responsible for the service provision, quality, financing and availability. For example, protection of municipal property, collection of local taxes and fees, management of municipal property, etc. On the other hand, transferred competencies are financed from budgetary chapters of respective ministries. Slovak municipalities (i.e. local self-governments) receive central government funding based on a formula which reflects among other variables the number of citizens, altitude, number of students living in the municipality, number of citizens over the age of 62, etc. For example, construction offices, registry offices and schools belong to transferred competencies.

Local self-governments or municipalities and in the case of Bratislava, city boroughs hold regular local elections in which voters can directly elect their local representatives. Due to the large number of deputies in the territory of Bratislava (17 borough mayors, 1 city mayor, 272 borough councillors and 45 city councillors) and the associated expenses, one of the aims of the paper is to demonstrate the possibility of spending less public finances by simply reducing the number of borough councillors. Of course, other means of increasing efficiency and effectiveness are possible. For instance, even in some transitional economies with a significant degree of state ownership, local governments can be successfully supported by their public enterprises [3].

2   Material and Methods

The paper explores the concepts of economy and efficiency as two of the 3 Es (the remaining one being effectiveness). For the purposes of this paper, the authors focus on two of them: economy (i.e. spending less) and efficiency (i.e. doing more with less). Economy shall be understood as cost-effectiveness or an effort to minimize costs, i.e. minimizing public expenditure. Efficiency goes one step forward and expects a particular process to perform better in terms of the input vs output ratio. Hence, a city borough that aims to perform both economically and efficiently should focus on providing its services and/or performing its basic legal competencies at the lowest possible cost and with the highest possible outputs. The authors understand the complexity and various details behind local self-government expenditure, competencies and service provision. Quality of service provision is for instance one

of crucial topics that deserve thorough research attention but it is not taken into consideration in this paper. Some research has already been conducted in the area quality and service provision by local self-governments in Slovakia. [2] Although this might be seen as a research limitation and authors readily admit it, focusing on selected aspects of economic and efficient use of public resources reveals at least some parts of the self-government expenditure and service provision mosaic in Bratislava.

The paper sets two aims. First, to discuss the possibility and potential financial benefits from decreasing the number of borough councillors. From an economic perspective, such a measure would be the easiest to implement and would immediately result in relatively small but quick financial gains for the boroughs. However, this is a hard measure to pass politically – voluntarily and perhaps even harder through the national legislative process.

Second, the aim of the paper is also to analyze and financially compare two of the transferred competencies – namely the registry offices and construction offices – from the budgetary and public expenditure perspective. The aim is to provide suggestions for change that will contribute to more economic and efficient use of public finances. These two competencies were selected purposely due to the fact that both are transferred competencies (i.e. public finances are transferred separately for them from the central government budget). Furthermore, they will also bring some contrasting perspective since registry offices are regarded as being sufficiently financially covered or subsidised, whereas construction offices are seen by many city boroughs as being underfunded. Perhaps the only realistic option for boroughs has been to co-fund (i.e. further subsidise) them using their local budgets and own financial resources. This, of course, means that financial resources are missing elsewhere. Based on collected financial data, the paper will show to what extent these claims are substantiated or not and how individual boroughs financially manage and cover these two selected competencies.

In terms of data collection, the authors collected necessary quantitative data from readily available sources published online (e.g. boroughs' budgets) but some data had to be collected by means of Freedom of Information requests. For instance, the figures regarding the number of borough councillors are publicly available on borough websites. However, the authors had to submit a number of Freedom of Information requests in order to receive annual expenses and councillors' remuneration data. The authors of the paper readily admit that the research methods used in this article are rather simplistic and limited in scope. Instead, more sophisticated research methods and tools, non-parametric and parametric reference technologies such as DEA could be used in further research to provide more accuracy and depth. [9]

3 Results and Discussion

3.1 Cutting the number of councillors

The number of councillors in each Bratislava borough and municipality in Slovakia depends primarily on the size of their population. However, each municipality has the right to decide on its own number of councillors within the legally set minimum and maximum limit. Bratislava city boroughs can have – based on their population - between 5 and 35 councillors. The lowest number of councillors is in the boroughs of Čunovo, Devín, Jarovce and Lamač, while the largest number of councillors is in the most populous borough of Petržalka.

Until recently, there was no minimum or maximum limit regarding councillors' remuneration. This changed in 2018 and the law now sets a limit to the councillors' remuneration which can be a maximum of 1/12 of the municipal mayor's salary. However, at the time of collecting data for this article, all Slovak municipalities including the 17 Bratislava city boroughs could decide on the remuneration of their councillors as they saw fit. Hence, Table 1 shows significant differences across the 17 boroughs in terms of remuneration per councillor.

The paper has already mentioned the abundance of elected representatives in the city of Bratislava (17 borough mayors, 1 city mayor, 272 borough councillors and 45 city councillors). Having such a vast number of paid representatives and at the same time claiming that funding is

not sufficient makes cutting the number of councillors as the first and easiest way of cutting expenditure. There could be an argument made regarding the need for more representatives, which could claim a greater extent and options for representative democracy. However, one of the key expectations from political representation or any form of democracy or government in general, is its functioning and cost. [6] Voters can legitimately question the need to remunerate more than 300 elected city representatives in a city of under 500 thousand inhabitants when cities of a similar population or size can do a better job with significantly fewer paid elected representatives. For instance, the Municipality of Copenhagen (Denmark) with a population of 600 thousand has only a 55-member city council and 1 Lord Mayor. City of Chandler (Arizona, USA) has only 5 council members and one mayor in a city of 250 thousand people.

Table 1: Number of councillors

City borough	Population*	No. of councillors	No. of councillors per 1000 citizens	Possible no. of councillors	Suggested no. of councillors	No. of councillors per 1000 citizens after change	Change in no. of councillors	% change in no. of councillors	Councillors' remuneration - annual expenditure	Councillor's average annual remuneration	Councillor's average monthly remuneratio	Councillors' remuneration - annual expenditure after change	Difference in councillors' average annual remuneration
Čunovo	1 332	7	5,26	5 - 7	5	3,75	-2	28,57	1 973,00 €	281,86 €	23,49 €	1 409,29 €	- 563,71 €
Devín	1 297	7	5,40	5 - 7	5	3,86	-2	28,57	- €	- €	- €	- €	- €
Devínska Nová Ves	16 060	12	0,75	9 - 15	9	0,56	-3	25,00	87 179,22 €	7 264,94 €	605,41 €	65 384,42 €	- 21 794,81 €
Dúbravka	33 090	25	0,76	15 - 25	15	0,45	-10	40,00	85 488,00 €	3 419,52 €	284,96 €	51 292,80 €	- 34 195,20 €
Jarovce	2 011	7	3,48	7 - 9	7	3,48	0	0,00	- €	- €	- €	- €	- €
Karlova Ves	33 260	25	0,75	15 - 25	15	0,45	-10	40,00	88 516,00 €	3 540,64 €	295,05 €	53 109,60 €	- 35 406,40 €
Lamač	7 110	7	0,98	7 - 9	7	0,98	0	0,00	30 537,91 €	4 362,56 €	363,55 €	30 537,91 €	- €
Nové Mesto	37 650	25	0,66	15 - 25	15	0,40	-10	40,00	162 904,34 €	6 516,17 €	543,01 €	97 742,60 €	- 65 161,74 €
Petržalka	103 935	35	0,34	25 - 35	25	0,24	-10	28,57	133 290,34 €	3 808,30 €	317,36 €	95 207,39 €	- 38 082,95 €
Podunajské Biskupice	21 644	15	0,69	9 - 15	9	0,42	-6	40,00	74 109,71 €	4 940,65 €	411,72 €	44 465,83 €	- 29 643,88 €
Rača	20 791	15	0,72	9 - 15	9	0,43	-6	40,00	88 867,37 €	5 924,49 €	493,71 €	53 320,42 €	- 35 546,95 €
Rusovce	3 610	9	2,49	7 - 9	7	1,94	-2	22,22	17 933,00 €	1 992,56 €	166,05 €	13 947,89 €	- 3 985,11 €
Ružinov	71 443	25	0,35	15 - 25	15	0,21	-10	40,00	257 292,00 €	10 291,68 €	857,64 €	154 375,20 €	- 102 916,80 €
Staré Mesto	39 470	25	0,63	15 - 25	15	0,38	-10	40,00	216 107,36 €	8 644,30 €	720,36 €	129 664,43 €	- 86 442,95 €
Vajnory	5 556	9	1,62	7 - 9	7	1,26	-2	22,22	33 796,32 €	3 755,15 €	312,93 €	26 286,03 €	- 7 510,29 €
Vrakuňa	20 114	15	0,75	9 - 15	9	0,45	-6	40,00	69 670,04 €	4 644,67 €	387,06 €	41 802,02 €	- 27 868,02 €
Záhorská Bystrica	4 559	9	1,97	7 - 9	7	1,54	-2	22,22	9 267,00 €	1 029,67 €	85,81 €	7 207,67 €	- 2 059,33 €
SUM	422 932	272	0,64	-	181	0,43	-91	33,46	1 356 931,63 €	4 988,72 €	415,73 €	865 753,48 €	-491 178,15 €

Source: Authors.

The obvious financial indicator with public expenditure saving potential is the number of councillors and their annual and average remuneration. One other important indicator is also the number of councillors per 1000 inhabitants, which brings a more comparative perspective of whether boroughs really need such a high number of councillors. Boroughs of Devín and Lamač were the only boroughs where councillors were not given any remuneration. Devín was in the state of receivership and hence they did not have much choice. Councillors in Jarovce on the other hand voluntarily chose not to be given any remuneration in the given year and saved the resources for other use by the borough.

Based on the obtained data, the authors created a table that includes, in addition to the above data, a proposal for changes in the number of councillors, as well as the potential cost saving, should this proposal be implemented. The proposal to adjust the number of councillors is based on the legal minimum and maximum number of councillors that boroughs can have. Therefore, the authors used the minimum number as both a proposal and the benchmark for some simple calculations and the corresponding results than can be seen in the table. Based on the proposed model, the number of councillors of all boroughs would be 181. Despite being still a high number, it would mean a reduction by 91 councillors compared to the current situation. The number of councillors per 1000 inhabitants would be 0.43 rather than the current 0.64 councillor per 1000 inhabitants.

The table also shows significant differences in average councillor's remuneration. For instance, councillors in Ružinov received 10 291.68 € as their average annual remuneration. On the other hand, the councillors in Čunovo received only 281.86 €. Perhaps most importantly, total annual councillors' remuneration would be under the authors' proposed model 491 178.15 € less. It could be argued whether this is a significant cost-cutting mechanism but nevertheless it could be one of a number of ways how to cut unnecessary cost. In case of a much more radical decrease of the number of councillors, the resulting sum would be even more interesting.

Examples from across the world show that local government can be effectively managed and citizens can feel even more democratically empowered with less councillors. There are other numerous means of public participation (e.g. participatory budgeting, e-referendum, citizen focus groups, public meetings and discussions, etc.). [7] Hence, public participation and local democracy should not be limited to merely electing councillors once every 4 years – no matter the ratio of citizens per councillor. Elections and representative democracy neither guarantee nor automatically lead to citizen involvement.

3.2 Registry offices

From the many original and transferred competencies that municipalities are obliged to perform, the authors selected two transferred competencies: registry offices and construction offices. This was done on purpose due to the fact that the two competencies are performed by most Bratislava boroughs and hence are possible to compare and benchmark. Almost all boroughs have their own construction offices except for Devín, Dúbravka and Lamač, which have entrusted the borough of Karlova Ves to perform this role in exchange for their funding. All boroughs run their own registry offices.

City boroughs' representatives generally argue that central government subsidies for the municipal construction offices are largely insufficient (collected data proves this) and by contrast, subsidies for the municipal registry offices are sufficient (collected data also proves this). Hence, comparison of these two particular competencies should also bring interesting data in terms of (in)sufficient funding which could also support or refute the general political statements.

The authors examined the following data obtained through publicly available sources and Freedom of Information Act requests, in particular:
- subsidies from the national budget for the registry and construction offices,
- revenue from fees collected by the registry and construction offices,
- expenditure of the registry and construction offices,
- number of staff working at the registry and construction offices,
- surplus or extra funding needed to cover offices' expenditure (= subsidy + collected fees - expenditure)
- expenditure per citizen,
- average cost per employee.

Funding for the registry offices is provided from the national budget and also from the administrative fees that municipalities collect. Results in Table 2 show that only 5 of the boroughs (Podunajské Biskupice, Staré Mesto, Rusovce, Vajnory, Vrakuňa) must extra co-fund this competency since the national government subsidy and revenue from the collected fees seem to be insufficient. However, the table also shows boroughs which have a much better expenditure per citizen and average cost per employee than others. Naturally, every borough is different and there are unique characteristics which have an impact on these results too (e.g. level of population growth). Nevertheless, some of the results are very contrasting – even in boroughs with similar populations and size (e.g. Podunajské Biskupice vs. Rača, Rusovce vs. Záhorská Bystrica). Boroughs with the best results in terms of expenditure per citizen and average cost per employee (Záhorská Bystrica, Rača, Jarovce) can be used as performance benchmarks not only for the 5 boroughs which need to co-fund this competency but also for other boroughs which could save more resources and use them elsewhere.

Table 2: Registry offices

City borough	Population*	Subsidy from the national budget for the registry office	Revenue from fees collected by the registry office	Expenditure of the registry office	No. of staff working at the registry office	Funding needed to cover expenditure on top of fees	Expenditure per citizen	Average cost per employee
Čunovo	1 332	1 864,69 €	166,00 €	1 865,00 €	1	165,69 €	1,40 €	1 865,00 €
Devín	1 297	Karlova Ves						
Devínska Nová Ves	16 060	11 477,10 €	14 375,10 €	19 092,09 €	1	6 760,11 €	1,19 €	19 092,09 €
Dúbravka	33 090	Karlova Ves		3 533,01 €	0	3 533,01 €	0,11 €	- €
Jarovce	2 011	1 864,69 €	202,00 €	1 898,82 €	1	167,87 €	0,94 €	1 898,82 €
Karlova Ves	33 260	42 495,13 €	20 599,00 €	59 091,00 €	3	4 003,13 €	1,78 €	19 697,00 €
Lamač	7 110	Karlova Ves						
Nové Mesto	37 650	101 020,38 €	17 611,43 €	108 811,46 €	5	9 820,35 €	2,89 €	21 762,29 €
Petržalka	103 935	104 537,25 €	37 815,00 €	126 582,74 €	6	15 769,51 €	1,22 €	21 097,12 €
Podunajské Biskupice	21 644	11 477,10 €	21 892,50 €	58 332,07 €	3	- 24 962,47 €	2,70 €	19 444,02 €
Rača	20 791	11 477,10 €	9 951,50 €	13 567,92 €	1	7 860,68 €	0,65 €	13 567,92 €
Rusovce	3 610	4 000,78 €	2 920,00 €	18 320,00 €	1	- 11 399,22 €	5,07 €	18 320,00 €
Ružinov	71 443	95 329,61 €	34 484,00 €	95 330,00 €	7	34 483,61 €	1,33 €	13 618,57 €
Staré Mesto	39 470	66 587,08 €	33 073,17 €	118 869,71 €	6	- 19 209,46 €	3,01 €	19 811,62 €
Vajnory	5 556	6 136,87 €	550,50 €	7 256,89 €	1	- 569,52 €	1,31 €	7 256,89 €
Vrakuňa	20 114	11 477,10 €	9 744,50 €	25 614,00 €	2	- 4 392,40 €	1,27 €	12 807,00 €
Záhorská Bystrica	4 559	4 000,78 €	402,00 €	4 001,00 €	0,4	401,78 €	0,88 €	4 001,00 €
SUM	422 932	473 745,66 €	203 786,70 €	662 165,71 €	38,4	22 432,67 €	25,75 €	-

Source: Authors.

One of the goals was to show whether national government subsidies provide enough funding to cover selected transferred competencies. Only five of Bratislava's boroughs have to co-fund this activity since the national subsidy and the collected administrative fees are not enough. However, instead of co-funding, they ought to analyse their internal processes and find possible ways to cut costs and/or make their registry offices work more efficiently. Devín, Lamač, Dúbravka and Karlova Ves are good examples of how sharing competencies and basic concepts such as economies of scale and working together can result in an economically viable solution for all. Further research is necessary to assess more closely not just the 5 underperforming boroughs but also other boroughs and their respective registry offices and reasons for their financial results. Nevertheless, from financial and comparative perspectives, they seem to have limits that can be and should be addressed by their local leadership – for example, through staff performance appraisals. [8]

3.3 Construction offices

Similarly to registry offices, construction offices also belong to the group of transferred local self-government competencies. However, construction offices compared to registry offices need to be co-funded by Bratislava boroughs to a much greater extent. This is not merely political rhetoric but also supported and proved by collected financial data. Table 3 shows that 14 out of 17 construction offices need further co-funding since both national government subsidies and revenue from fees collected by construction offices are not sufficient. Data shows that almost 800 thousand € had to be covered by boroughs' own financial resources. Only three boroughs ended up with surpluses (Čunovo, Devín, Ružinov). Again, further research is needed to look more deeply into the workings of the three surplus boroughs and the 14 underfinanced boroughs.

Construction offices' agenda is to a large extent affected by the number of inhabitants, structure of population (e.g. young families moving in and building houses), extent of business and real estate activity, etc. Hence, one employee's annual agenda in a small and rather rural borough such as Čunovo deals with significantly different construction issues and agenda compared to her colleague in the inner city borough of Staré Mesto. Nevertheless, when boroughs of similar size and urban development character are compared, this still brings very contrasting results especially in terms of cost per citizen and average cost per construction office

employee. For instance, Vajnory and Záhorská Bystrica are boroughs of similar population size and both are undergoing significant construction activity. However, the borough of Vajnory spent only 6.72 € per citizen on the construction office agenda and the average cost per construction office employee was 12 445.04 €. By contrast, the borough of Záhorská Bystrica spent nearly twice as much (11.68 €) per citizen and the average cost per employee was more than double (26 614.00 €).

Table 3: Construction offices

City borough	Population	Subsidy from the national budget for the construction office	Revenue from fees collected by the construction office	Expenditure of the construction office	No. of staff working at the construction office	Funding needed to cover expenditure on top of fees	Cost per citizen	Average cost per construction office employee
Čunovo	1 332	1 047.00 €	1 377.00 €	1 047.00 €	1	1 377.00 €	0.79 €	1 047.00 €
Devín	1 297	1 147.00 €	12 150.00 €	1 174.00 €	3	12 123.00 €	0.91 €	391.33 €
Devínska Nová Ves	16 060	14 769.33 €	58 671.00 €	123 955.11 €	7	- 50 514.78 €	7.72 €	17 707.87 €
Dúbravka	33 090	30 589.00 €	35 236.00 €	112 500.00 €	8	- 46 675.00 €	3.40 €	14 062.50 €
Jarovce	2 011	1 828.64 €	7 810.80 €	31 935.41 €	3	- 22 295.97 €	15.88 €	10 645.14 €
Karlova Ves	33 260	32 212.00 €	46 909.00 €	115 663.00 €	7	- 36 542.00 €	3.48 €	16 523.29 €
Lamač	7 110	6 416.07 €	15 750.00 €	41 865.25 €	3	- 19 699.18 €	5.89 €	13 955.08 €
Nové Mesto	37 650	34 330.02 €	72 097.45 €	184 936.86 €	12	- 78 509.39 €	4.91 €	15 411.41 €
Petržalka	103 935	97 570.02 €	109 297.80 €	306 595.46 €	14	- 99 727.64 €	2.95 €	21 899.68 €
Podunajské Biskupice	21 644	19 798.77 €	23 857.57 €	99 483.31 €	4	- 55 826.97 €	4.60 €	24 870.83 €
Rača	20 791	19 708.27 €	42 519.00 €	102 587.76 €	5	- 40 360.49 €	4.93 €	20 517.55 €
Rusovce	3 610	3 040.00 €	12 610.00 €	44 101.00 €	1.5	- 28 451.00 €	12.22 €	29 400.67 €
Ružinov	71 443	65 191.00 €	89 905.00 €	119 274.00 €	21	35 822.00 €	1.67 €	5 679.71 €
Staré Mesto	39 470	46 090.66 €	65 922.93 €	398 723.78 €	16	- 286 710.19 €	10.10 €	24 920.24 €
Vajnory	5 556	5 004.33 €	19 720.00 €	37 335.11 €	3	- 12 610.78 €	6.72 €	12 445.04 €
Vrakuňa	20 114	18 287.52 €	16 315.00 €	77 522.12 €	4	- 42 919.60 €	3.85 €	19 380.53 €
Záhorská Bystrica	4 559	3 719.00 €	27 523.00 €	53 228.00 €	2	- 21 986.00 €	11.68 €	26 614.00 €
SUM	422 932	400 748,63 €	657 671,55 €	1 851 927,17 €	114,5	-793 506,99 €	101,68 €	275 471,86 €

Source: Authors.

The authors acknowledge the fact that construction office agenda is very complex and even two otherwise similar boroughs may face different challenges resulting in significantly different expenditure. However, differences in cost per citizen and average cost per construction office employee are significant not only between individual boroughs that share similar characteristics but across all the 17 boroughs. This naturally raises the issue of economic and efficient use of public finances. Is there an inherent financial problem resulting from the lack of national government subsidy to cover this crucial self-government competency or is it rather a problem of financial management? In other words, if three construction offices can be in a surplus, why cannot the rest 14?

4 Conclusion

The article offered suggestions for possible changes in order to decrease the cost and increase efficient use of public finances in 17 Bratislava city boroughs. Two key solutions were proposed and discussed. First, reduction in the vast number of city borough councillors which would save at least 491 178.15 € each year. Second, using the analysis of selected competencies transferred from the central government to the municipal registry offices and construction offices, the paper provided a comparative perspective and showed the differences in expenditure and efficiency of individual boroughs and their respective offices. The authors identified performance benchmarks among boroughs and discussed the claims of insufficient funding given to construction offices.

This admittedly simplistic but necessary financial analysis showed that Bratislava city boroughs still have considerable reserves in the management of public funds and that the argument of insufficient national subsidies is not completely valid and should be addressed by local leaders in more detail and demonstrated by corresponding data. Otherwise, it will remain merely as political rhetoric and a smokescreen to cover waste of public resources. Also, results

and conclusions ought to be questioned and tested by other quantitative and qualitative methods. More sophisticated methods and tools such as DEA could be used in further research to bring more accuracy and depth into the topic.

Acknowledgements

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- Freedom of Information Act replies from city boroughs.

The Impact of Public Expenditure Efficiency on Labour Productivity in V4 Countries

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Abstract

This paper is focused on the comparison of labour productivity in the four Visegrad countries (the Czech Republic, the Slovak Republic, Hungary and Poland). It briefly deals with the measurement of labour productivity on a macroeconomic scale. The main goal of this paper is to compare the development of labour productivity in the four Visegrad countries as related to public expenditures based on labour market policies and average wages. We use linear and nonparametric correlation analyses to quantify the association between the tested variables. To explore associations between variables we also use graphical displays. The results of our analysis on labour productivity show the dependency of the two indicators, namely the labour productivity and average wages. Moreover, no correlation was found between labour productivity and public expenditure on labour market policies for all V4 countries. The outcome for labour market policies expenditure shows in the highest correlation between the Czech Republic and Hungary, but no significant result for other V4 countries. It could be caused by different government strategies on labour policy and non-economic influence.

Keywords: labour productivity; average wages; labour market policies expenditure; Visegrad countries.

JEL Classification: C10, E24, J24, H5

1 Introduction

The economic community is strongly interested in the productivity of all kinds of production factors especially because it is closely connected with the growth of the real wages and living standards of the population. Labour productivity is an indicator of vital importance. It is used as GDP per person employed. The productivity of the four Visegrad countries may be dependent on public expenditures and wages. Labour market policy expenditure or decisions in this area could have influenced the development of labour productivity.

Several authors, who are interested in this topic, are Jardim et al.[1], Riley and Bondibene [2] The mentioned authors have looked at the issue of labour productivity with connection to policies, economic growth, welfare and their implications for wages. Labour productivity changes over time. The changes in productivity could depend on level of wages and labour policies. The evidence shows that productivity does not increase when there is a reduction in firm's workforce [2]. We can see the relationship between labour productivity and minimum wages as well. British authors [2] find evidence to suggest that companies responded to these increases in labour costs by raising labour productivity. Organisational changes, training and labour skills are also very important for rising productivity.

Many authors [3], [4], [5] etc. have attempted to analyse labour productivity and its determinants. According to neoclassical economic theory, price floor policies, including the minimum wage, should lead to a non-market equilibrium marked by excess supply and diminished demand. [1].

On the basis of observations, they are making a number of recommendations to promote the higher productivity of labour. For the higher labour productivity is important to consider the other determinants such as capital intensity, electricity intensity, fuel intensity and wages. Moreover, additional categories, for example, management and environment, should be included for the assessment of labour productivity [5].

The issue of labour productivity is also addressed in the scientific works of Boserup [6], McGowan and Andrews [7], Hansen [8] and many others.

The study [9] shows that unemployed individuals sympathizing with the political right are more strongly opposed to demanding measures than employed individuals with the same political preferences. Moreover, aggregate support is found to be correlated with the country's active labour market policies (ALMP) legacy, varying from high levels in Germany and the UK to low levels in Denmark and France. The findings suggest that most ALMPs are in fact implemented despite the opposition of their beneficiaries. The German labour market policy regime constitutes a reliable supporting pillar of the highly productive German employment system [10]. Main findings of Polish authors [11] show that there is a need to work out a complex evaluation of labour market policies in the EU to provide comparative analysis of the EU countries (or groups of countries). It would allow determining the level of development of the country in terms of the efficiency of labour market policies. The EU countries with the best labour market indicators represent diverse levels of LMP expenditure, which will be analysed in this research for the four Visegrad countries.

2 Material and Methods

The analysis includes three sets of data for the four Visegrad countries (Czech Republic, Slovakia, Poland and Hungary). Firstly, it includes the GDP per person employed as a measure of labour productivity. This variable is presented in Euros per person in 2010 price level. Secondly, the expenditure on labour market policies is used and presented in Euros spent by each V4 country. And thirdly, this research contains the level of average monthly wages in Euros for each year of V4 countries. All three datasets comprises of yearly data points from 2006 to 2016, which were downloaded from the Czech Statistical Office, Hungarian Statistical Office and Eurostat [12],[13],[14].

Pearson correlation [15] belongs to linear analysis. The correlation coefficient can take the values between -1 and +1, where -1 is perfect negative and +1 is perfect positive correlation between the variables. When the coefficient is 0 then there is no linear correlation. This method is widely used in the research as it highlights any relationships between tested variables. For example,[16] applied this method in their analysis.

The Pearson's coefficient is the covariance of the two variables divided by the product of their standard deviations. The form of the deviation includes a product moment, which is the mean of the product of the mean-adjusted random variables.

The Pearson linear analysis is followed by the Spearman nonparametric method, which is less restrictive and it is applied for robustness checks and comparative examination.

Spearman correlation [17] is a nonparametric correlation. It measures and determines the strength and direction of monotonic relationship between two ranked variables, where the two assumptions must be met. Firstly, as value of one variable increases, the other variable value increases. Secondly, as value of one variable increases, the other variable value decreases. This method is less restrictive than linear correlation.

3 Results and Discussion

The results in this chapter firstly look at each Visegrad country separately and after that it highlights the correlations for every tested dataset including all V4 countries.

Table 1 highlights the correlation coefficients for both methods in each country, and Table 2 represents the correlation outcomes for labour productivity, average wages and expenditure on labour market policies.

Table 1: Main correlation results for each V4 country

	Pearson		Spearman	
	LP and Wages	LP and LMP	LP and Wages	LP and LMP
Czech Republic	0.605**	X	0.836*	X
Slovak Republic	0.967*	X	0.973*	X
Poland	0.781*	X	0.836*	X
Hungary	X	X	0.700**	X

Note: * means 99% and ** means 95% significance level. x means not significant.

Source: Authors (2019).

Table 2: Main correlation results for each tested variable

|	Pearson				Spearman			
	CZ and SK	CZ and PL	CZ and HU	PL and SK	CZ and SK	CZ and PL	CZ and HU	PL and SK
Labour productivity	0.896*	0.857*	X	0.955*	0.964*	0.936*	X	0.973*
Wages	0.884*	0.850*	0.701**	0.885	0.882*	0.664**	0.655**	0.836*
LMP	X	X	0.815*	X	X	X	0.718**	X

Note: * means 99% and ** means 95% significance level. x means not significant.

Source: Authors (2019).

3.1 Czech Republic

The Pearson and Spearman correlation analysis indicate a medium strength positive relationship between the labour productivity, which is measured as a GDP per employed person, and the average wages. It shows that these two variables co-move together over the period between 2006 and 2016. Moreover, the impact of the set level of wages plays a role in growing labour productivity. None of the methods identified any correlation between labour productivity and the expenditure on labour market policies (LMP).

Figure 1: Labour productivity, LMP and averages wages in the Czech Republic
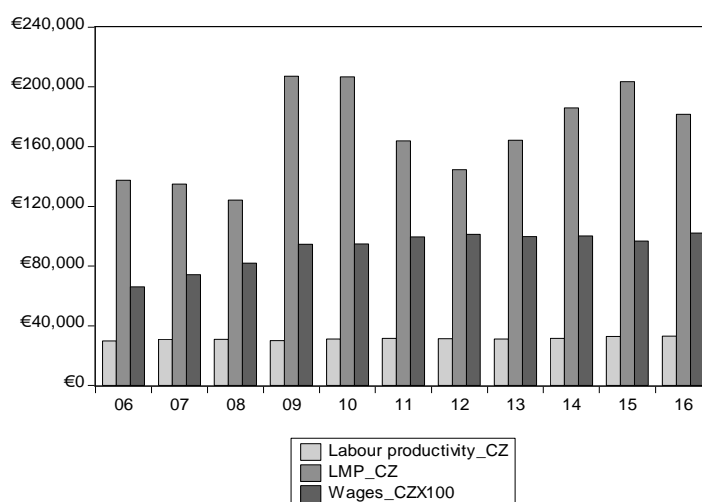
Note: All figures are in Euros. The average wages figures were multiplied by hundred for better illustration purposes.
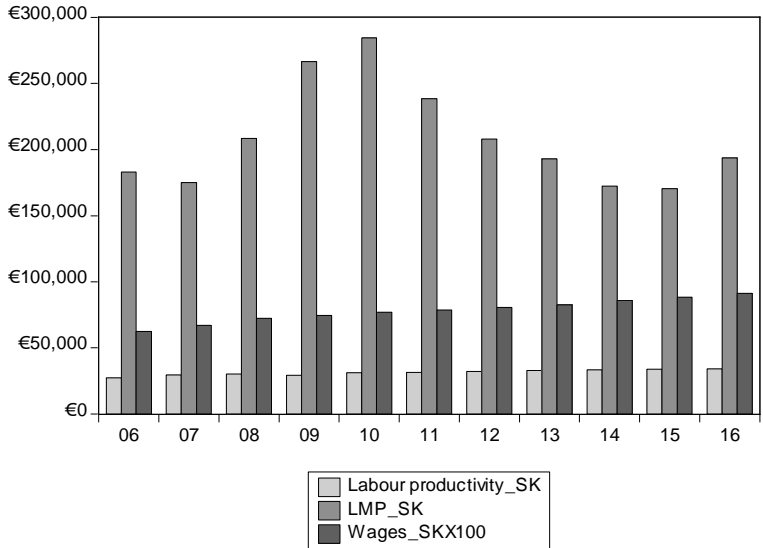*Source: Authors (2019).*

In Figure 1 is shown the historical development of labour productivity, expenditure on labour market policies and average wages. Average wages are multiplied by 100 for illustration purposes and better visibility.

3.2 Slovakia

The results from both correlation analysis exhibit very high (near to perfect positive) outcome. The Pearson coefficient is 0.967 and the Spearman correlation is 0.973. This very high correlation is between the LP and wages, where the behaviour is strongly interconnected and changes together over time. This result indicates even higher dependency than in case of the Czech Republic, which should be taken into account by policy makers as it reflect the level of growing labour productivity in this country. The outcome shows no correlation between labour productivity and the expenditure on labour market policies.

Figure 2 represents the historical development of all three variables between 2006 and 2016.

Figure 2: Labour productivity, LMP and averages wages in the Slovak Republic

Note: All figures are in Euros. The average wages figures were multiplied by hundred for better illustration purposes.
Source: Authors (2019).

3.3 Poland

High and positive correlation was found in case of Poland at 0.781 for Pearson and 0.836 for Spearman correlation, which suggests both linear and nonparametric correlation between labour productivity and average wages. Also, no correlation was found between labour productivity and LMP expenditure.

Figure 3 shows the development of the tested datasets in Poland.

Figure 3: Labour productivity, LMP and averages wages in Poland

Note: All figures are in Euros. The average wages figures were multiplied by hundred for better illustration purposes. Source: Authors (2019).

3.4 Hungary

The Pearson correlation outcome did not show a significant result at 5% level, but it indicated a correlation of 0.700 for Spearman nonparametric correlation at 5% significance level between LP and wages. The correlation between LP and LMP was not significant for any of the two methods.

In Figure 4 are featured the changing levels of the labour productivity, expenditure on labour market policies and average wages in Hungary.

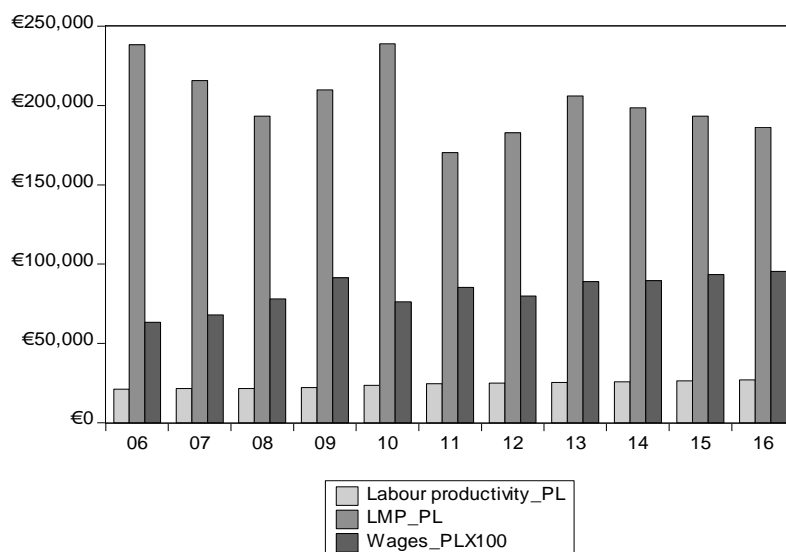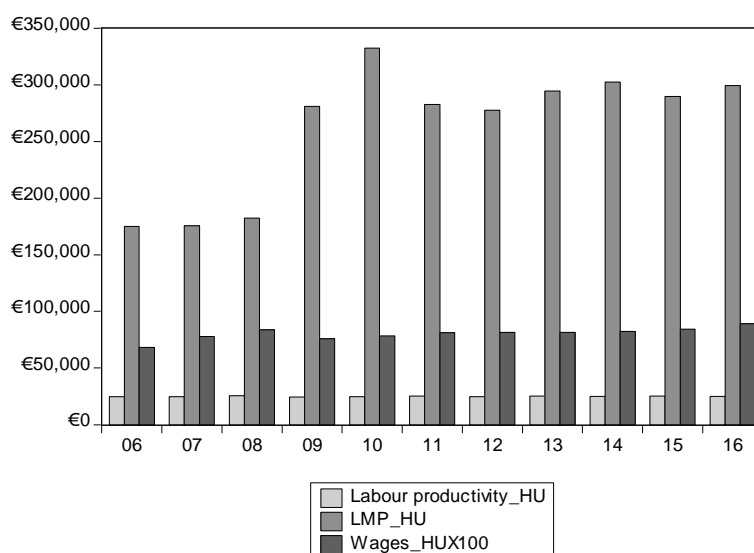**Figure 4: Labour productivity, LMP and averages wages in Hungary**

Note: All figures are in Euros. The average wages figures were multiplied by hundred for better illustration purposes. Source: Authors (2019).

3.5 Labour productivity

The outcomes for labour productivity indicate high positive correlation between the Czech Republic and Slovak Republic, also between the Czech Republic and Poland, and Poland and Slovak Republic. The highest labour productivity is displayed in the Czech Republic from 2006 to 2011 and from 2012 to 2016 in the Slovak Republic. No correlation was found between Hungary and other V4 countries. This can be due to a fact that Hungarian labour productivity differs in the development to other tested states, as shown in Figure 5.

Figure 5: Labour productivity of V4 countries
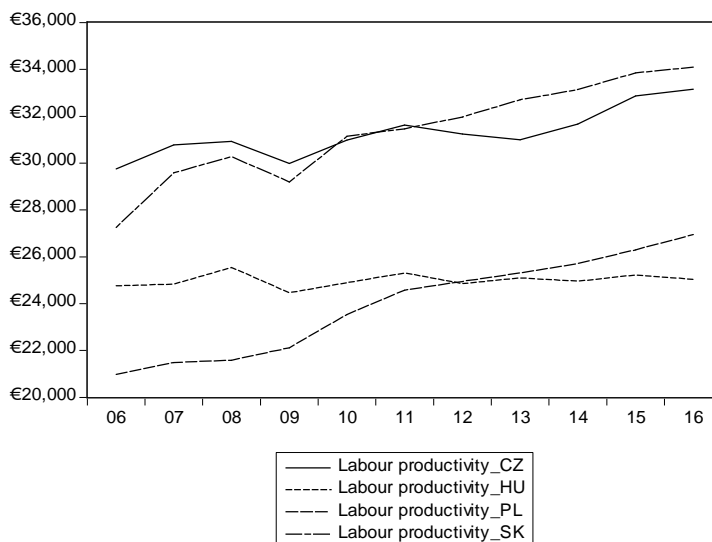
Note: Labour productivity is presented in Euros per person calculated from GDP in 2010 prices.
Source: Authors (2019).

3.6 Average wages

The findings show that there is a high and positive correlation for average wages between all four countries. The coefficient is the highest between the Czech Republic and Slovak Republic. However, the coefficient is the lowest for Hungary using both correlation methods. Again, this shows that Hungary slightly diverges from V4 countries, where from 2006 to 2008 the average wage was the highest in Hungary, which changed from 2009 onwards (see Figure 6).

Figure 6: Average wages of V4 countries
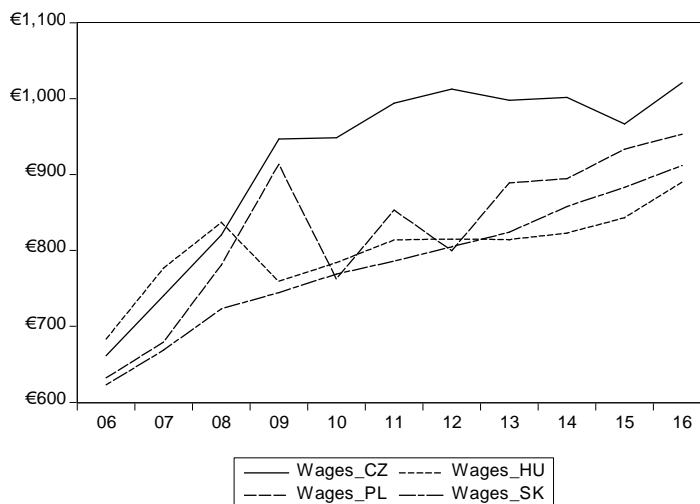
Note: The average wages are presented in Euros.
Source: Authors (2019).

Both linear and nonparametric methods displayed high and positive correlation between the Czech Republic and Hungary; however, the level of expenditure differs considerably among these two countries, as shown in Figure 7. There was no correlation found between other V4 countries. The expenditure on labour market policies shows how each government allocates the resources within this sector.

Figure 7: Expenditure on labour market policies of V4 countries

Note: The LMP figures are presented in Euros.
Source: Authors (2019).

4 Conclusion

The analysis of the labour productivity in V4 countries between 2006 and 2016 identified high and positive correlation between average wages and labour productivity. This result was confirmed by both (linear and nonpara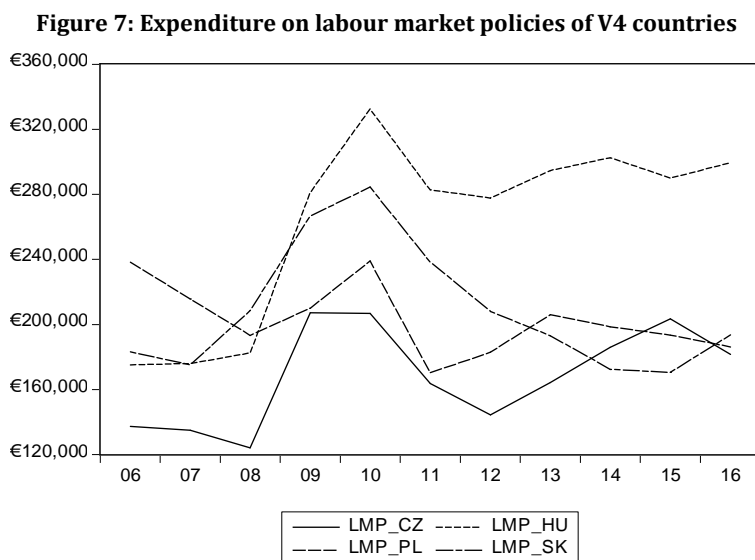metric) methods. The correlations between the Czech Republic, the Slovak Republic and Poland exhibited similar outcomes. This is in contrast to Hungary, where the results displayed different findings to other V4 countries when comparing the development of the labour productivity, average wages and expenditure on public labour policies. The efficiency of expenditure on public labour policies (LMP) did not confirm any significant results between labour productivity and LMP. This can be due to a fact the LMP includes multiple elements, which can be divided into sub-sections and analysed separately.

The greater demand for skilled workers and policies such as training schemes would be conducive to raising productivity even further. Also, other active components of the LMP expenditures such as contribution to support regional mobility, socially effective jobs or bridging allowance could help to mitigate the wage inequality effects and help to increasing of productivity.

Therefore, the future research could include active and passive components of the expenditure on the labour market policies to be able to distinguish how each part affects the labour productivity. Also, a regression analysis could highlight the relationship and impact of each LMP component.

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The Changing European Labour Market and its Consequences on Social Expenditure System

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Abstract

During the second half of the 20th century, significant changes in the structure and concept of the welfare state in Europe have emerged, mainly due to the changes in labour market. Since the 70s last century, progressive implementation of labour - saving technologies and current technologies based on the Internet of Things, Data and Services have been changing economic activity and consequently the character and forms of work. The accompanying phenomenon of these changes has been growing labour market uncertainty and unemployment. People threatened by the unemployment, especially by the long-term unemployment became dependant on social benefits and do not adequately contribute to the social system used to finance the benefits. Therefore, welfare state has found itself in a crisis. The aim of our discussion is to evaluate social expenditure trends of the EU Member States in the light of the labour market changes. Social expenditure trends are researched on the ESSPROS - Eurostat database on social protection. The methods used are extrapolation and prediction. The original welfare state was built on a well-functioning labour market with sufficient jobs creation, but new social risks emerged in last decades. We agree that the European countries will have to make a crucial decision, whether the European social model, which has played a key role in maintaining social contract in the past, is sustainable even in the future.

1 Introduction

Over a hundred years, the welfare state went through several stages, starting from the first insurance company systems through the "golden era" of the 1960's to the current welfare state crisis. Evolution of the social systems in the individual countries differed to a large extent with respect to the voluntariness, i.e. insurance cover obligation related to various losses. The oldest compulsory insurance concerned occupational accidents and was introduced in several European countries before the end of the 19th century. On the contrary, unemployment insurance was often voluntary and in most cases became compulsory after the World War I.

Since the past century, the European countries have gone through major social reforms. From the end of the 19th century, Europe has been one of the most dynamically developing continents in terms of social risk protection. Step by step the European welfare state started to evolving. The objective of the welfare state and the reason for its establishment was to protect families and individuals against social risks. Traditionally, this concerns adequate income to cover basic needs at the time of sickness, old age, disability, etc. Besides these traditional social risks, new risks started being discussed at the end of the 70s last century (hereafter: "the 70s"). The most significant problems appeared to be changes in the labour market and lack of cover all risks including the long-term unemployment [12].

The period of social expansion (1962 – 1973), sometimes also called "the welfare state golden era", is characterised by growing productivity and related rising standard of living of all social classes and high employment rate, in some Western countries up to almost full employment rate. Thanks to sufficient funds, the number of social benefits increased along with their amounts as well as the share of social expenses of the GDP [14].

During the 70s, the welfare state started gradually stagnating. The main reason was progressive implementation of labour - saving technologies, information and communication technologies (hereafter: "ICT") which have changed economic activity, the structure of production and afterwards the character and forms of work. The accompanying phenomenon of these changes on the labour market was growing uncertainty and unemployment [13]. The economic growth in mid-70's slumped to lower figures, whereas some countries had reached up to 5 % annual GDP increase in the previous decades. The European countries governments came up against great pressures of rising social expenditure related mainly to the rising unemployment and other benefits, such as benefits in need. Given the setup of the social systems in the past and the very limited possibilities of restricting some of the social expenditure, i.e. in health system, education, social services, the increasing public expenditure share was accompanied by public debt. As a result of these as well as other factors such as the population aging, the welfare states started struggling with the crisis which principally persists to the date [14].

Furthermore, next changes on labour market are expected in the concept "Industry 4.0". The term means the vision of increasing digitisation of production based on the Internet of Things, Data and Services [11]. The concept outlines the vision of the complete networking of all production processes and the increased use of robots, which control themselves. The robots are coming and if the forecasts are correct, it can mean the extinction for millions of jobs [6].

The original welfare state was built on a well - functioning labour market with sufficient jobs creation, but new social risks emerged in last decades. It is clear that given labour market changes and population aging have changed the view of the welfare state in Europe. *We agree that the European countries will have to make a crucial decision, whether the European social model, which has played a key role in maintaining social contract in the past, is sustainable even in the future.*

Social expenditure dynamics and trends in European countries are researched on the ESSPROS database on social protection [5].

2   Material and Methods

The objective of this paper is to evaluate the EU Member States social expenditure dynamics as well as to identify their current fiscal trend, which requires an analysis of social expenditure in a time series of the European countries. Therefore, the paper is based on the ESSPROS database on social protection [5].

However, we also need to identify the main directions affecting the fiscal pressures in European social policies. From that reason the paper is centred around the opinions of leading European experts on labour market and welfare state trends and on EU strategic documents.

The methods used are extrapolation and prediction. The basis for predicting future developments in the labor market is the analysis of the labor market development from the beginning of the industrial era and, in particular, the analysis of labor market changes due to the implementation of labor saving technologies in the 1970s. The sustainability of the European Social Model is derived from further predicted labor market developments.

3   Results and Discussion

It is necessary to identify main reasons affecting welfare state requirements. We have taken into our consideration primarily labour market risks, such as the unemployment and specially the long term unemployment. Since the 70´s labour market risks have begun to rise due to changes in dependence between economic growth on one hand and the volume of workforce on the other hand.

Industrial era dominated in Europe since the second half of the 19th century. However, at the beginning of the 70´s the structure of production, character and forms of work being changing with introduction of labour-saving technologies. Relations between economic growth

and jobs creation have weakened. A side effect of increasing labour productivity has become unemployment, which has been a commonly discussed problem in the EU Member States. The call for a common fight against unemployment was firstly published by the European Commission in the document Growth, Competitiveness, Employment-Challenges and Ways Forward for the 21th Century [3] and in the document European Social Policy-the Way Forward for the Union [4].

Labour-saving technologies weakened jobs creation. Owing to that, the world of work changed dramatically, free workforce started to pass from the industry to the service sector. Gradually the whole structure of the economy has changed, services are becoming dominant namely both in the share in GDP and in employment. With the time production of material property stopped being crucial for the economic growth, but production of knowledge and algorithms and their application has become the most important. This caused a change in the relation between the capital and labour.

If there had been a relation of mutual dependence between economic growth and volume and quality of workforce since the beginning of industrial era, in the last decades this interconnection ceases to be significant. The relation between economic growth and labour was separated which can be proved with the fact that the economic growth in the last decades of the 20th century started being reached even when the number of vacancies stagnated or increased very slowly [1]. At the beginning of that century, the International Labour Organisation stated that 1% economic growth encourages increase in new workplaces by 0.3% while the relation keeps weakening [10].

But already in the year 1969, the economic theory accepted a concept of so called natural unemployment rate where unemployment was considered being a natural phenomenon. The concept supposed the existence of the lowest sustainable unemployment rate in long-term corresponding with a potential product. Milton Friedman by the criticism of Philips curve coming from mutual dependence of unemployment and inflation based on the premise that unemployment can be reduced versus higher inflation, stated that the dependence is true only for a short-term period. In the long term, the Philips curve is stabilised at a level of natural unemployment corresponding with a potential product. Efforts to reduce the natural unemployment rate by means of demand oriented economic policy of the government or the Central Bank will lead to the rise in inflation only [7]. In the course of time it seems that the natural rate of unemployment keeps increasing.

Currently, labour market future is discussed. The trigger of this discourse was the German concept Industry 4.0 [11], which was first introduced in 2011 and followed by the concept Work 4.0 [Green Paper Work 4.0, 2016].The term "Industry 4.0" was first introduced by the German Industry-Science Research Alliance in 2011. In 2012, the German Working Group on Industry 4.0 presented a set of recommendations to the German federal government. The Industry 4.0 workgroup members are recognized as the driving force behind Industry 4.0 [2].

Industry 4.0 is the vision of increasing digitisation of production. The concept describes how the Internet of Things, Data and Services will change production, logistics and work processes in the future. The changes brought about by networking based on the Internet of Things, Data and Services have a greater impact than for industrial production alone because they affect not only economies, but also the world of work and social life as a whole. The concept Industry 4.0 is now shaping the digital discourse in Europe because further changes are expected with the implementation of new innovations and technologies [15].

The robots are coming and if the forecasts are correct, it can mean the extinction for millions of jobs. Innovations may seem grandiose, but they can also be destructive, rendering entire professions obsolete even as they boost productivity and convenience. If widespread predictions are correct, automation in the workplace is set to increase at an unprecedented rate [9]. Many areas of manual work are being affected. Robots in factories and warehouses are becoming more mobile, versatile and affordable. It is not just manual labour that is ripe for automation: white-collar jobs are also at risk as software becomes more sophisticated. Data analysis work in areas such as advertising and finance is being outsourced to computers.

One issue that will loom ever larger as the incidence of automation increases is income and social inequality. Automation is fundamentally the substitution of capital for labour. The problem is that the people who already have the capital are the ones who will benefit most, because they are the ones who will invest in the new automation. In other words, the rich will get richer and the rest will suffer. The Internationale Labour Organization (hereafter: "ILO") needs to respond to the future of the work ongoing changes in order to be able to advance its mandate for social justice.

Labour market uncertainty, unemployment and especially long-term unemployment alongside with population aging are significant reasons of changing opinions on the role of the state in the field of social policies. However, it can be shown that the importance of the welfare state remains stable.

According to the latest data from Eurostat, the statistical office of the European Union, the social protection expenditure reached 28.1 % of the GDP in the European Union in the year 2016. Since 2006, these expenditure in the European Union has increased, from 25.6 % of GDP in 2006 to 28.1 % in 2016. Eurostat data indicate long-term increase in the social protection expenditure till the year 2010. A rapid increase occurred at the time of the financial crisis between 2008 – 2010, which was accompanied by increasing unemployment. However, stagnation the social protection expenditure can be seen in the following years. Social protection expenditure started stagnating in the second decade of that century, but their share in GDP remains high. For more details see table No. 1.

Table 1: Total social expenditure as a percentage of GDP in the time period 1995 – 2016

Country	1995	2006	2008	2010	2012	2014	2016
EU 27	.	.	25.6	28.6	28.7	28.7	28.1
EU 28	.	25.7	25.9	28.6	28.7	28.7	28.1
Eurozone	.	26.2	26.5	29.2	29.4	29.7	29.2
Included:							
Belgium	27.3	26.6	27.7	29.4	29.6	30.2	29.8
Bulgaria		13.9	14.7	17.0	16.6	18.5	17.5
Czech Republic	16.7	17.6	17.9	20.1	20.4	19.7	18.9
Denmark	31.9	28.4	28.9	32.4	32.0	32.8	3.6
Estonia		12.0	14.7	17.6	15.0	14.9	16.4
Finland	31.4	25.4	25.1	29.3	30.1	31.9	31.8
France	30.3	30.7	30.8	33.2	33.8	34.5	34.3
Ireland	18.6	17.1	20.2	24.8	23.6	20.6	15.8
Italy	24.3	25.6	26.7	28.9	29.3	29.9	29.7
Lithuania	.	13.3	15.9	19.1	16.3	15.3	15.4
Latvia	.	11.9	12.1	18.3	14.4	14.4	15.2
Hungary	.	21.9	22.3	22.5	21.3	19.8	29.2
Germany	28.3	27.8	27.2	29.9	28.8	29.0	29.4
Netherlands	30.6	26.3	26.1	29.3	30.6	30.6	39.5
Poland	.	19.7	19.3	19.7	18.9	19.1	20.3
Portugal	20.4	23.7	23.4	25.8	26.4	26.9	25.2
Austria	28.8	27.5	27.6	29.6	29.2	29.8	30.3
Greece	22.3	20.6	22.8	25.9	28.1	26.4	26.6
Slovakia	18.5	16.0	15.7	18.2	18.0	18.5	18.4
Slovenia		22.3	21.0	24.4	24.9	23.9	23.3
United Kingdom	27.1	24.8	25.7	28.8	28.9	27.5	26.2
Spain	21.6	20.0	21.4	24.6	25.5	25.4	24.3
Sweden	33.5	28.6	27.9	28.8	29.5	29.5	29.6

. *not available*
Source: Eurostat- Esspross (2019).

The EU average continued to mask major disparities between Member States. While the social protection expenditure reached 28.1 % of the GDP in the European Union, social protection expenditure in Eurozone exceeded 29 % of the GDP in Eurozone. Traditionally, Europe is led by France with nearly 34.3 % of social expenditure in the GDP in the year 2016 and ranked the top. Furthermore, Finland, Belgium, Denmark, Netherland, Italy, Austria, Sweden, Germany, United Kingdom and Greece currently spend over one fourth of their GDP on social

protection expenditure. In contrast, social protection expenditure stood below 20% of GDP in Romania, Latvia, Lithuania, Estonia, Ireland, Malta, Bulgaria and Slovakia, as well as in the Czech Republic. These disparities reflect differences in living standards, but are also indicative for the diversity of national social protection systems, labour market changes and population ageing specific to each Member State. For more details see figure No. 1.

Figure 1: Social Expenditure as % of GDP, year 2016
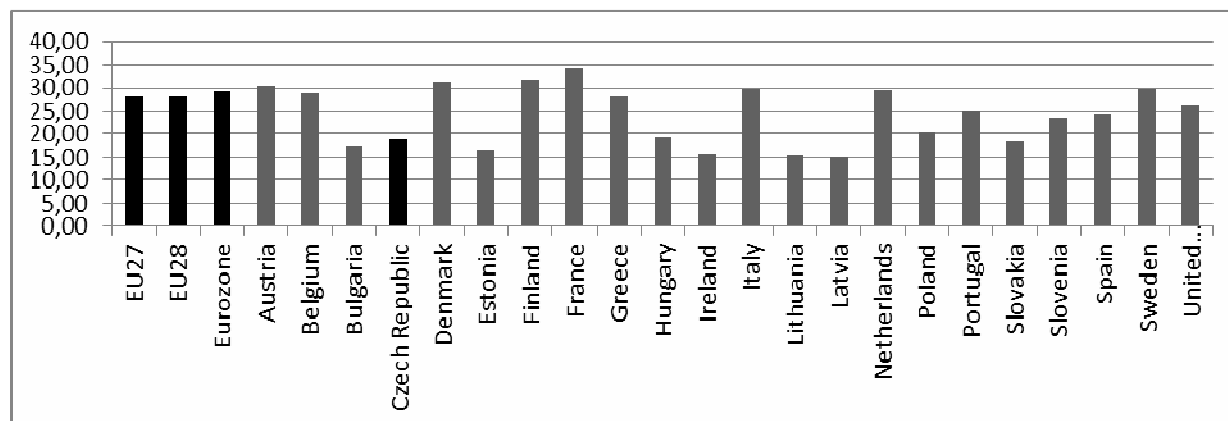
Source: Eurostat- Esspross (2019).

Social protection expenditure *per capita* varies substantially across Member States. In 2016, social protection expenditure per capita in Purchasing Power Standards (hereafter "PPS"), which eliminates price level differences between countries, showed large differences between EU Member States. After Luxembourg, the highest expenditure per capita were recorded in Denmark and Austria. In contrast, the lowest expenditure per capita was registered in Romania, Bulgaria and Latvia.

Although there are common features in the evolution of the welfare state in the individual countries, for example the growing role of the state in social policy, rate of redistribution and provision of social services, there are also many differences between them. The scope of social services differs depending on the economic conditions of the state, traditions, values and historic development.

4 Conclusion

The original welfare state was built on a well-functioning labour market, but new social risks emerged in last decades. It can be said that the industrial era dominated in Europe since the second half of the 19th century ends today. A big change came in the 70s, when the character of economic activity has changed due to the implementation of labor saving technologies and forms of work have changed as well.

If there had been a relation of mutual dependence between economic growth and volume and quality of workforce typical for the industrial era, nowadays the interconnection does not go anymore [1]. The relation between economic growth and labour was separated which can be proved with the fact that the economic growth during the last decades of the 20th century started to be reached even when the number of vacancies stagnated or increased very slowly [3]. Similarly the International Organisation of Labour states that 1% economic growth encourages increase in new workplaces by 0.3% while the relation keeps weakening [10].

Further changes are expected on labour market due to the implementation of new innovations and technologies. The concept Industry 4.0 is the vision of digitized economic activity describing how the Internet of Things, Data and Services will change production, logistics and work processes in the future and how will change the world of work and social life as a whole. The concept Industry 4.0 is now shaping the digital discourse in Europe because the robots are coming and if the forecasts are correct, it can mean the extinction for millions of jobs.

People threatened by the unemployment become dependent on social benefits and do not adequately contribute to the social system used to finance the benefits. Unemployment and labour market uncertainty have become part of social and economic reality of Europe together with the increase of disadvantaged groups of population on the labour market since the 70s. Europe keeps struggling with the labour market uncertainty and with the problem of sustainability of the welfare state. Digitization and robotics can even increase these problems. However, the implementation of the Industry 4.0 concept brings major changes in economic activity, which can ultimately affect competitiveness and economic development. The most developed countries are aware of this fact.

The social policy is trying to treat families facing social problems with various social benefits and allowances. The current social policy expenditure in the European countries has been kept at a high level for a long time. In most European countries, in particular the western ones, the expenditure exceed 25% of the GDP, i.e. more than one-fourth of their GDP. However, EU Member States are heterogeneous in terms of social aspects. One of the reasons for the increased EU heterogeneity was the EU expansion to the east. An example can be shown: the rate of social expenditure in France is 34% of GDP, while in Latvia only 15%. Europe diverges in social aspects not only because of the economic development of the individual countries but also as a result of various approaches to the social matters. The EU Member States tend to be divided into groups based on the recognition and practicing of a different social expenditure philosophy and this is one of the reasons why the EU fails to achieve a single direction.

As emphasised by ILO expert, Daniel Vaughan-Whitehead [14], the European Social Model played a key role in shaping up the European society after the 2. Word War by encouraging inclusive economic growth, high standard of living and decent working conditions. In some of the European countries the key elements of the European Social Model have been transformed in response to the crisis that began in 2008. As a result of the crisis it has turned out that the current form of the European Social Model is not sustainable. The European Commission as well as ILO has come to realize that certain elements of the European Social Model need to be transformed in light of such challenges such as high unemployment, especially long term unemployment and population aging in Europe. Therefore, it is presently necessary for the European Union to make a crucial decision, whether the European Social Model, which has played a key role in maintaining social contract in the past, is sustainable even in the future.

Acknowledgements

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Efficiency Measuring in Public Administration from the Employees´ Perspective

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Abstract

Most developed countries around the world still have budget deficits at the moment of economic growth. Instead of creating reserves for a period that may not be beneficial from a macroeconomic point of view, most of these countries are increasing consumption expenditures and virtually passing through their income. In addition, in recent years, the issue of efficiency not only of consumer spending but also of investment projects has become more and more frequent. Ensuring objective monitoring and evaluation of efficiency in public administration is, however, very problematic, both from the point of view of politicians´ and managers´ abilities, as well as from their fear of failure. This paper describes basic ways to measure efficiency in the public sector. Its aim is to identify a method of measuring efficiency based on a survey of employees in public administration in the Czech Republic, which is the most appropriate - on the basis of selected criteria (e.g. simplicity, complexity, time requirements, etc.). The survey results show that the most promising measurement of efficiency is through performance indicators. On the contrary, methods that are often used to evaluate business performance are not transferable to public sector at all. The reason is their big focus on profit or theoretical and application complicatedness.

Keywords: Efficiency; Public Sector; Survey; Efficiency measuring

JEL Classification: H11; H21; C83

1   Introduction

At present, most countries around the world are facing high debt, and surplus budgets in developed countries are rather an exception. Even though 10 years have passed since the last financial crisis, political representation in most countries has failed to find a way to sustainable public finances. As a result, there is an ever-increasing growing trend of mandatory spending, which is primarily driven by household consumption or savings, instead of investments that would generate added value and would be a source of income in the future.

The behavior of politicians is, however, understandable. In today's dynamic times, political representation uses public finance to a large extent as a means of retaining and gaining more potential voters. [14] Public finance reforms that worsening or reversing more and more wastage by public resources are politically very poorly enforceable.

Governments pay people, which put high pressure on wage growth not only in the public sector. With the increase in the amount of money that is intended to pay wages, the sense of the importance of relevant officials also grows. [4, 20] According to an individual job offer, more and more employees are in a situation where they demand higher wages, but they do not match their productivity. Here, however, public administration is faced with a fundamental problem, namely the impossibility to determine the financial relationship between inputs (pay) and outputs (work). Unlike the private sphere, it is not the goal of public administration to make a profit, so officials cannot use financial indicators to assess their efficiency, which would make it possible to find out if their work is worthwhile. [13]

However, it is not only a problem of evaluating and improving the performance and efficiency of the wages of employees in public administration but also of the various activities and projects that public administration finances. It can be public goods (education, health, public transport, etc.) and also various types of public services (e.g. elections, provision of data and information, official boards, IT portals, etc.). This paper focuses on the topic of performance and

efficiency evaluation, a topic that is very unpopular in public sector, and which is more spoken and written than realized.

2   Literature overview

Efficiency in general (effectiveness) can be characterized by two main components, which are expediency (results must match their quantity, quality, and structure of needs) and economy, i.e. cost-effectiveness (action must be at the lowest cost). In order to talk about the efficiency of the activity, both conditions have to be met at the same time. Increasing efficiency occurs when the effect is increased (increasing its quantity, quality, structural change) and reducing the costs associated with this effect.

Governments move to measure accomplishments and associated outputs, activities and costs, many faces mounting pressure to produce efficiency measures, which show "units of output or outcome per unit of input" for every program. Improvements in outputs per unit of cost can easily come at the expense of service quality.

When evaluating efficiency, methods used in the economic sphere are used in a specific specification, the modification is also applied in the area of public administration. [10, 18] Given the real use of public sector efficiency assessment methods, this article compares only those methods that, according to the Ministry of the Interior, have the greatest realization potential. They are Management by Objectives (MBO), key performance indicators (KPIs), Balanced Scorecard, data envelopment analysis (DEA), benchmarking, and assessment of compliance rates (rating scales and evaluating interviews). [11]

Metrics - Rating scales indicate the status of a particular system, eventually its efficiency. Metrics are of a quantitative or qualitative nature, which can also be expressed as an objective value. Even though it is a very simple method of efficiency evaluation, at first sight, it is used, for example, in Lean manufacturing (LM). It involves all practices, activities, tools, methods and techniques designed to reduce and even eliminate waste within organizations. [16]

Management by Objectives (MBO) is a method based on setting and mutually agreeing on goals and evaluating the success of their achievements. [3] This method emphasizes the result rather than how it is achieved. It gives greater discretion to decision-makers and line staff who are responsible for meeting the goal as well as for fulfilling it. In terms of international comparisons in public administration, this is the most used method of efficiency evaluation. [11] This method is further developed in the Balanced Scorecard method, which additionally includes a requirement of inter-linking goals.

Balance scorecard (BSC) is a strategic management and efficiency measurement system developed by Robert S. Kaplan and David P. Norton in the 1990s. [7] The BSC is based on the principle of the balance of individual objectives, which requires the identification and evaluation of several objectives in a context. The main areas of the organization's assessment are financial perspective, customers (clients) perspective, process perspective, learning, and growth. The BSC method is applicable in all areas, including the public sector, for which the financial perspective has also been modified to the budgetary perspective. [18]

Key Performance Indicators (KPIs) include performance indicators (metrics) of particular processes, services, organizational units, organizations. KPIs, in addition to the required quality and efficiency. These indicators are used at all management levels within the organization, particularly in the area of strategic management and management by objectives (MBO). Their use is fairly common in both the private and public sectors. [11]

Evaluating Interviews (person-to-person method) are one of the main methods used mainly in human resources. As part of the evaluation interviews, the emphasis is placed on planning and examining the fulfillment of partial goals, developing employee skills and adequate remuneration. Efficiency is usually rated by senior, subordinate, colleagues, but also to people outside the organization, for example, business customers or citizens with whom the person under review comes into contact.

Another method that is often used to evaluate efficiency is benchmarking. This method is based on the systematic measurement and comparison of selected indicators with respect to other reference values, which may be either historical or comparable with other reference entities (eg other comparable departments or comparable organizations). Currently, benchmarking in public sector is used, for example, to evaluate the efficiency of building management, health care etc. [2, 6, 8, 9] Benchmarking is a major benefit to the public sector due to the fact that it brings elements of market competition to the public sector. [15,17,19]

The Data envelopment analysis (DEA) method is used to evaluate the technical efficiency of production units based on the size of inputs and outputs. DEA models are based on the Farrel model for measuring the efficiency of single-input and single-output units. Assessed units may be businesses, but also hospitals, schools, offices. [5] However, this method is practically not used in public administration. [11]

3 Methodology

The aim of this paper is to answer the question of which of the above-mentioned methods the public employees evaluate as the most preferred one or the "best one", and which method is, therefore, most preferred by them. Such a finding can then completely change the general idea of the most appropriate method that can be measured by efficiency and then consider whether efficiency measurement is efficient if the public administration staff does not identify with the chosen method and tends to not work consistently. In this case, measuring efficiency could not be done efficiently.

The answer to the above-mentioned research question is found on the basis of data from the questionnaire survey (a deliberate and purposeful selection of respondents based on availability and voluntariness) conducted in the 4Q 2018, using research methods based on the logic principles, ie analysis - synthesis, induction - deduction.

Firstly, the structured interview method was used to create the questionnaire. It helped identify the most important criteria that affect the efficiency assessing process - simplicity intelligibility of the method, time-requirements, financial requirements, ease of data and information collection, objectivity, and comparability and the possibilities of overall use in their organization. Subsequently, the questionnaire was sent to the relevant representatives (especially auditors and economic experts) of all regions and approximately 80 municipalities within the Czech Republic, which are involved in the benchmarking project, with a request to evaluate the weights of individual criteria and to evaluate specific methods according to these criteria. For the evaluation, the rating scale from 1 to 6 has been used, where 1 was the worst and 6 best. Subsequently, these values were recalculated on a percentage scale, where 1 rated 0% and 6 rated 100%. Finally, the responses were processed in MS Excel and the basic characteristics were calculated in the IBM SPSS Statistics software. Subsequently, the Criterium Decision Plus program was used for overall managerial comparison.

4 Results

4.1 Characteristics of respondents

A total of 161 respondents (106 women and 55 men) of 10 Czech regions and the capital city of Prague participated in the questionnaire survey. They were mainly employees of municipality offices (69.6%) and regional offices (14.9%). Other employees worked in government administration bodies.

The biggest share (55%) of employees was 46-64 years old. It was due to the predominance of these employees in both senior positions (management) and public administration in general. The reason for this is the remuneration of employees, which depends, among other things, on the length of the work experience (increasing the length of the work experience increases the tariff wage). Young employees in public administration do not work in proportion to older people, and they do not have a significant influence on executive decision-

making. This is related to the length of respondents' work experience, while 29 employees (18%) work in the public administration less than 3 years, 71 employees (44.1%) work there more than 16 years.

Another identifying feature was education. As the questionnaire was designed for more qualified employees, the share of university educated employees is a significant majority (80.8%), as expected. Other employees have either secondary education (17.4%) or higher vocational education (1.8%). For more educated employees, they are also generally more likely to hold managerial positions. A total of 73 (45.3%) of respondents held a leading position. 67 (91.8%) from these managers were university graduates. These managers mostly (69.9%) had up to 50 directly and indirectly subordinates.

In general, it can also be stated on the basis of the responses that the target group (public administration employees, who have the possibility to influence the measurement of performance and efficiency) participated in the questionnaire. The respondents are mainly managers with a higher length of work experience, and it can be assumed that the given issue is not strange for them.

1.1 Criteria evaluation

Specific methods of measuring efficiency may be very different, so respondents firstly evaluated significant of the performance criteria (simplicity and intelligibility, introduction speed, implementation speed, financial requirements, ease of data and information collection, objectivity, and comparability). The highest importance was attributed by the respondents to objectivity (5.39 points, i.e. 87.8%) and to simplicity and intelligibility (5.24 points, i.e. 84.8%). On the contrary, time requirements (introduction and implementation speed) have the lowest importance (3.99 points, i.e. 59.8%, or 4.40, i.e. 68.0%).

Table 1: Criteria preferences evaluation - men, women, and managerial positions (yes / no) (%)

	Simplicity and intelligibility	Introduction speed	Implementation speed	Financial requirements	Ease of data and information collection	Objectivity	Comparability
Men	80.8	62.2	61.8	75.2	78.2	87.2	78.6
No	62.8	64.2	57.2	80.0	65.8	91.4	68.6
Yes	86.8	61.4	63.4	73.6	82.4	85.8	82.0
Women	86.8	58.4	71.2	74.4	84.4	88.2	82.4
No	87.0	57.8	71.0	74.8	84.4	89.2	82.8
Yes	86.2	60.0	71.2	73.2	84.4	85.6	81.8
Total	84.8	59.8	68.0	74.6	82.2	87.8	81.2

Source: Authors.

However, not all employees evaluate the criteria alike. Based on the chi-square test goodness of fit (for a level of significance alpha = 0.05) it can be stated that the difference in the evaluation of the simplicity and ease of data and information collection in the men who hold the managerial position and those who are not managers is statistically significant. Managers attach greater importance to simplicity, which may indicate some disbelief to their subordinates and their ability to understand the method. On the other hand, there is no statistically significant difference between women and men.

In general, simplicity and objectivity are most important for most of the employees. On the other hand, financial and time requirements (e.g. staff training costs, the time needed to determine competencies, etc.) do not play such an important role, but the differences are not too large between the criteria. This means that all the criteria are important in the end.

1.2 Efficiency measurement methods evaluation

From the point of view of the aggregate results of the evaluation of specific methods used to measure efficiency, the differences among different groups (gender, age, education, length of

practice, regions, managerial positions, etc.) were not significantly different. The following table shows the evaluation of the individual methods according to the specified criteria:

Table 2: Evaluation of the efficiency measuring methods – men, women (%)

|	Simplicity and intelligibility	Time requirements	Financial requirements	Ease of data and information collection	Objectivity	Comparability
Rating scale						
Men	77.0	56.2	69.4	62.2	51.6	47.2
Women	84.0	55.2	61.6	59.6	48.0	50.0
Total	81.6	55.6	64.2	60.4	49.2	49.0
Management by objectives						
Men	60.4	53.0	52.6	46.6	61.4	53.8
Women	62.8	49.2	50.4	48.2	58.0	52.6
Total	62.0	50.6	51.2	47.6	59.2	53.0
Key performance indicators						
Men	61.4	43.0	49.2	43.2	63.6	61.4
Women	66.4	55.4	56.2	50.8	63.0	60.8
Total	64.8	51.2	53.8	48.2	63.2	61.0
Person-to-person method						
Men	72.8	43.8	51.2	41.8	43.6	51.2
Women	83.2	41.6	50.6	36.8	49.0	45.6
Total	79.6	42.4	50.8	38.6	47.2	47.6
Benchmarking						
Men	73.8	54.6	55.8	48.8	62.6	61.4
Women	70.6	46.2	55.6	44.0	63.0	65.0
Total	71.6	49.0	55.6	45.6	62.8	63.8
Balance scorecard						
Men	39.0	32.0	33.8	31.0	68.0	56.8
Women	47.0	29.8	33.4	30.6	61.2	54.6
Total	44.2	30.6	33.4	30.6	63.4	55.2
Data envelopment analysis						
Men	33.4	32.0	36.8	29.4	61.0	53.4
Women	42.2	27.2	30.4	29.8	57.0	49.0
Total	39.2	28.8	32.6	29.6	58.4	50.6

Source: Authors.

Generally, the simpler methods (rating scale, person-to-person method and benchmarking) were considered by all respondents as intelligible and not financially and time-consuming. Contrarily, the use of key performance indicators, balanced scorecard, and data envelopment analysis are seen as relatively complex and costly. On the other hand, these methods are mostly seen as objective and comparable, unlike the rating scale.

However, in partial responses, it was possible to identify interesting differences. For example, the balanced scorecard method was rated by young men (under 26 years old) as relatively simple (4.00 points, i.e. 60.0%), but not very appropriate in terms of time requirements (3.50 points, i.e. 50%). Such a combination may mean that these people know the method, and, for example, they have encountered it during their studies, but they see it as impracticable in their surroundings. Additionally, some partial responses show a difference between age groups, employees under 26 years old, and over 46 years old rated methods more extreme than those from 27 to 45 years old, which mostly correspond to their average. This may be seen in the key performance indicators from the point of view of comparability. Older employees evaluate this method equally worse, and on the other hand, younger employees better.

After taking into consideration the weights of the individual criteria, a decision tree was compiled in the decision support system. A comparison of the individual methods was made, in Figure 1 there are five methods that have been evaluated as the most preferred:

Figure 1: Contribution to the most preferred method
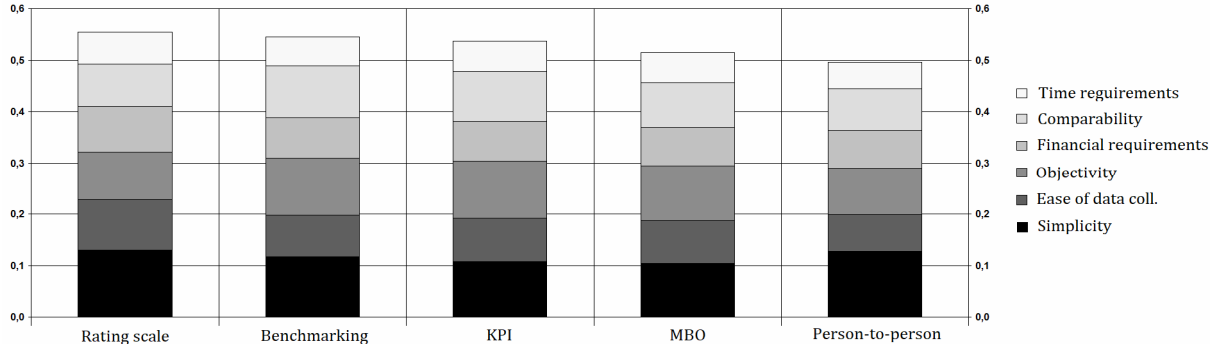
The most preferred method is the rating scale, despite the fact that it is seen as one of the least objective and comparable method. However, in terms of other criteria (simplicity, ease of data and information collection and financial and time requirements), it is evaluated as the most appropriate and according to the results of the comparison, approximately 56% fulfills the characteristics of the ideal method that can be used for the efficiency evaluation. An alternative to this method is benchmarking, which is characterized by a high level of comparability and objectivity, but not by such simplicity of data collection or time requirements. Similarly, key performance indicators were evaluated as appropriate of about 53%. The difference between these three methods is relatively small. Conversely, the balanced scorecard and data envelopment analysis methods were found to be less appropriate. Although most employees consider it to be more objective than the rating scale, they are also considered as very complex and in the public administration almost imperceptible, despite the fact that, for example, the balanced scorecard method uses a set of performance indicators.

1.3 Sensitivity analysis

In order to determine whether the ranking of selected efficiency evaluation methods would change significantly if criterion weight changed, a sensitivity analysis was also performed. For the weighting of all criteria, except for objectivity and comparability, there were only minor changes in the order of most preferred methods, and the rating scale method was still recommended. However, with the criterion of objectivity and comparability, the result would change with the weighting of these criteria (see Fig. 2).

Figure 2: Sensitivity to the most preferred method - objectivity
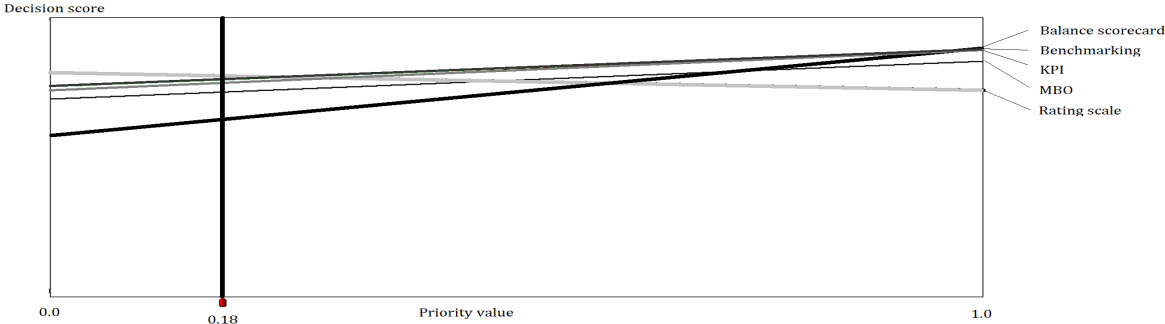
If the overall weight of this criterion of 18% exceeds 25% then it would be the most preferred benchmarking method. Further growth would increase the preference of other methods - key performance indicators, management by objectives and finally balance scorecard. The balance scorecard method would become the most appropriate method for measuring efficiency in public administration in the case of the weighting the criterion of over 93%. Similarly, even if the relevance of the comparability criterion would increase, in such a case, the most preferred methods would be benchmarking, KPIs and balanced scorecard.

5 Discussion and conclusion

There are a big number of researches and practical uses of performance and efficiency evaluation methods. Some of them evaluate efficiency by comparing performance indicators [e.g. 2, 6], or they use more advanced efficiency evaluation methods that require greater knowledge. [5] Nowadays, however, public administrations are struggling with the lack of highly qualified employees who are able to fully enforce and apply efficacy assessments across the organization. The analysis of the Ministry of Interior shows that the most widely used way of measuring the efficiency in the public administration in Europe is a way of using performance indicators. [11, 12] Effective research in the Czech Republic, for example, Bohatá et al., aimed at streamlining the performance of public policies at the central, regional and local levels. The methodology emphasizes quality management and is based on the Common Assessment Framework CAF (Common Assessment Framework). [11]

The aim of this paper was to extend the field of performance and efficiency assessment in public administration to the employees' perspective. Based on the questionnaire survey, it was examined how these effective staff assessment methods are viewed by these employees and whether and how they identify with each method. The results of the survey show that employees, regardless of gender, age, education or length of practice, prefer the simpler methods more than more complex. For example, methods based on performance indicators, which, unlike rating scales or interviews, have a higher potential in terms of objectivity, comparability, and simplicity, unlike the DEA method, which most employees reject because of their complicatedness.

A possible limitation of this finding is the fact that respondents have a hypothetical view of the issue of efficiency assessment, not the real state. The greatest preference may to some extent reflect resistance to change and learning new things that could increase efficiency in public administration. On the other hand, the issue of introducing management methods and methods of efficiency assessment, which are used in the private sector, has not yet met in the public administration with a warm reception. The New Public Management period was followed by a Good Governance era that leaves a very free interpretation of efficiency. Against this background, there is no other way than to encourage managers in public administration to see what they see as appropriate and forward-looking, thereby enabling them to improve efficiency in ways that are more useful in practice but also emphasize non-financial factors.

Acknowledgements

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Evaluation of the Service Quality in Public Hospitals from the Patient's Perspective – the Case of Albania

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Abstract

Patient's outlook and opinions need to be taken increasingly into consideration, because they are the ones who consume the services and are therefore provided with more valuable information on the manner and quality of the services being offered. For this reason, the assessment of patient opinion on the general aspects of hospital care, collected during hospital stay, could provide an opportunity to identify potential areas where patients are satisfied or dissatisfied, as well as to present a general picture regarding the quality of services provided by the hospital, in order to take appropriate action to improve them. The aim of this paper is to present a set of perceptions about the quality of health services that patients receive during their hospitalization in public hospitals in Albania, focusing particularly on two research questions or topics, general satisfaction with hospital services and the rating of hospital health services though patient perceptions. Methodologically, this paper is initially based on primary research, most notably through the SERVPERF method, where the quality of hospital services is evaluated through measuring 5 component dimensions: Tangible, Reliability, Responsiveness, Assurance, and Empathy. The instrument used was a questionnaire, answered by 115 patients hospitalized at the regional hospital in Durres City, one of the largest hospitals in Albania. The data collected were processed and aggregated to conclude in the overall assessment of the quality of hospital services from the patient point of view with regard to responsiveness (best evaluated), followed by assurance, reliability, empathy and tangible elements.

1 Introduction

Historically, setting standards of quality in healthcare facilities has been delegated to medical professionals and not casually the quality has been determined by clinicians, whose focus was technical aspect of providing care, where cure or improvement of the health condition is one of the basic expectations of the health service [4]. In our opinion, quality in healthcare organizations can not be claimed simply and only by inspecting whether the technical quality standards are met or not. Improvement requires the implementation of a total quality culture that should include supporting staff, medical staff, managers / administrators, policy makers and especially patients. According to the recent literature, patients provide valuable and unique information on the quality of care [26], as it is even believed that the main indicator of healthcare is the patient's satisfaction with the quality of the health service and not the health status. Nowadays healthcare organizations should constantly make attempts to identify the needs and expectations of patients and then provide services according to them [2]. The evaluation of hospitals' services quality, from the patient point of view, is not a new topic for the development countries, but in Albania the studies in this area are very rare, and conducted only during the last 5-6 years. In general, there is a lack of research on this field, focused on Albanian healthcare organisations and especially on hospitals, most of which are public. This emphasize the need for further research or studies on perceived hospital services quality in our country, that adhere to be part of European Union and the fulfilment of the quality standards is an obvious priority.

2   Literature review

Service quality perception wildly has been in the focus of many studies from the last three decades. Because of the services quality special nature, which is intangible, simultaneous, and heterogeneous, researchers have been making constant efforts in defining the concept, as well as in evaluating effective measurement methods. Still nowadays there is no agreement between them, and they are far from a consensus, about a universal model and assessment methods. However, almost all the researcher agree on the fact that service quality is a cognitive construct [10].

Service quality is defined as an assessment of customer, from the overall excellence of service [28], as the difference between customer expectation and their perception about the service experience [21], where quality is satisfactory, if performance meets with expectations [14]. The importance of healthcare quality cannot be underestimated, since quality of a healthcare service is whatever the patient perceives it to be [11].

Service quality can determine the degree of competitiveness among healthcare organizations. Therefore, it is very important for hospitals to assess what patients value and how they perceive the quality of care, to assess and improve the usefulness of their medical practices and procedures [23]. Different studies have evaluated the link between service quality with patient satisfaction [8] [16] [17] [18] [25], with the hospital operational measure of utilization [18], with hospital financial performance [12] [9] [18], with the level of loyalty and recommendation to others or positive word-of-mouth endorsements [1], and it influence on the patient's health [10]. Service quality assessment enables hospital administrators to recognize quality deficiencies perceived by patients and enhances the efficiency and quality of services to exceed expectations and reach patient satisfaction.

Increasingly, in the environments of healthcare organizations is widely accepted the approach, that the implementation of the overall quality can be achieved through two main moments. First, the quality assessment should be evaluated from the point of view of "relevant associates" (including not only providers of care, funders, policy makers and health administrators, but also users) and secondly based on explicit criteria, that among others reflect the core values of a society. In an effort to evaluate the quality of services, marketers have developed nineteen models during the 1984-2003 period [24]. These models essentially have a key purpose - to highlight service quality components, so that administrators or managers can further improve them.

The quality of services in the health sector is divided into two main components: technical and functional [13] [20]. Technical quality (clinical quality) refers to characteristics, such as education, training, staff diagnosis skills, their experiences, etc. Meanwhile, functional quality refers to the way of providing services to patients (eg. behavior of the staff, communication of doctors and nurses towards patients, cleanliness of facilities, quality of hospital food, etc). Because most patients do not have the opportunity to make an accurate assessment of the technical attributes, patient-centered quality measurement models, focus more on the functional qualities perceived by the patient, to reach an assessment of health services [3]. The literature has increasingly emphasized the importance of the patient's perspective, and many researchers strongly believe that the quality of health care needs to be studied from the patient's point of view [5] [27]; considering it as an important indicator of quality in health care services [6] [19].

The SERVQUAL quality service is one of the most important models. This method is based on the assumption that quality of service is a function of the differences between customer expectations and perceptions that it has for these elements. It focuses on five quality dimensions - the model is the result of some research projects of Parasuraman et al,. [20] [21] [22]. Initially, the model was based on 10 quality service dimensions, which were later reduced to 5 dimensions. This model focuses on the differences between patient expectations and perceptions for each of the 5 dimensions of quality. Although a widely used method of quality assessment in various industries, the criticisms related to it were numerous, particularly with regard to the large number of questions, difficulties of administration, data replenishment, etc., [6] [7]. From literature review, it appears that this model has been used in many researches in

some service industries, and its has been applied also in several different countries around the world.

3   Materials and Methods

Primary quantitative data were collected through a questionnaire, designed according to the SERVPERF method [6]. First part asks for general information on sociodemographic data i.e. age and gender. The second part consists of five sections, aimed at measuring the perceived quality of the patients with a total of 23 questions. Likert scale was used, from 1 (unacceptable) to 5 (fully agree). This section has five dimensions, first measures the quality of tangible elements and consists of six statements. The second dimension relates to the elements of seriousness and consists of five statements. Third dimension is about readiness and response, and is made up of four statements. The fourth dimension has five statements and is dedicated to elements related to security and trust. The last dimension has three questions and assesses empathy or sensitivity.

Study included 115 patients, who received health services at the Regional Hospital in Durres (Albania). The main condition for participation was the age of patient (over 18) and staying for treatment at the hospital minimum one night. Questionnaires were filled by patients themselves, or by a relative of patient, who has stayed with him, attending the service for at least one night. Only pediatric department was excluded from the study.

4   Results and Discussion

Actually, the Albanian health system is mainly public and the state is the main provider of the most of the health care services offered to the population as in the field of promotion, prevention, diagnosis and treatment. According to the Albanian Ministry of Health, public healthcare spending in 2016 reached $355 million. Albanians spend approximately 6.8 % of GDP on healthcare, 583 euro per capita [29], divided almost evenly between public and private services. Most of the hospitals in Albania are public, categorized according to legislation (Law No. 9106, dated 17.07.2003, On Hospital Service in the Republic of Albania, amended) in daily hospitals; b) hospitals at the municipal level; c) regional hospitals; d) tertiary hospitals. The first private hospital in Albania was founded in 2007, but the number has grown and today there are 11 private hospitals in the country, mainly concentrated in Tirana. Meanwhile, there are 45 public hospitals located in different cities in Albania.

This survey was conducted with the patients of the Durres regional Hospital, with a capacity of 340 beds - the second largest regional hospital in Albania. It is a state-run healthcare institution with an independent, non-profit budget. The Health Insurance Institute (HII) concludes a contract with the hospital in Durres, which defines the methods of data retention, the calculation of expenses, the procedures for their submission, the payments and reimbursements, according to the methods approved by both parties. This is the first case of such financing of a public hospital In Albania, where all the costs of the hospital are carried out by the HII, while resource allocation is managed by the board of hospital itself. With the release of the financial result, the hospital represented by the Administrative Board, has the right to propose to the HII changes in the payroll system, representing this way a lot of challenges or defiance for its administrators, where the patient centered strategy should be on focus.

The main purpose of the study consists on assessment of the general satisfaction with hospital services in Durres Hospital, as one of the largest in Albania. The second purpose consists on rating of hospital health services, based on patient perceptions through five quality dimensions, deriving from SERVPERF method.

The first dimension measures the quality of tangible elements and consists of six statements, such as general conditions of hospital settings, equipment, auxiliary materials, cleanliness of premises, personnel appearance. The second dimension relates to the elements of seriousness, and consists of 5 statements, such as: the hospital does the right thing in the first

attempt to provide the services, offers them at the time it has promised, insists on keeping and processing accurate, error-free data.

The third dimension is about readiness and response, and is made up of 4 statements, such as: quick delivery of the service, timely response to patient requirements, staff is always ready to assist the patient, etc. The fourth dimension has 5 statements and is dedicated to elements related to security and trust, and contains: the preparation and possession of appropriate staff knowledge, staffing, security of the patients from the services received, etc. The sixth dimension has 3 questions and assesses empathy or sensitivity, where assertions tend to focus on giving individual attention to patients by the staff or the hospital as a whole.

4.1 Age and Gender

Regarding the age of the patients involved in the study, from the questionnaire analysis it is noted that 17% of them are of 18-30 years of age, 25% of them belong to 30-45 age group, 31% of respondents are aged 45-60 (this is the dominat group) and 27% of the age over 60 years. Likewise, most of patients are males: 53%, compared to women who accounted for 47% of total.

4.2 Evaluation of Hospital Services Based on Quality Dimensions

Here follows the discussion of data regarding the quality components, according to Cronin and Taylor. More specifically, graphical data will be presented regarding the assessment that hospitalized patients in different pavilions at the Durres Hospital have done for hospital services, focusing on each constituent statement of each of the 5 dimensions.

4.2.1 Tangible elements

As seen from the Fig. 1, the constituent elements of the first dimension, which are related to the *tangible elements*, have a rating of 2.5 (from the maximum of 5). The general conditions of the hospital premises have the highest rating for this dimension. It appears from this result that the hospital offers somewhat good conditions, but there are still no attractive premises. In the hospital it appears that even the materials related to the service are not entirely visually appealing. Estimates for these two elements are the lowest compared to others, respectively 2.5353 and 2.5647 points.

Figure 1: Evaluation of First Dimension Elements - Tangible Elements
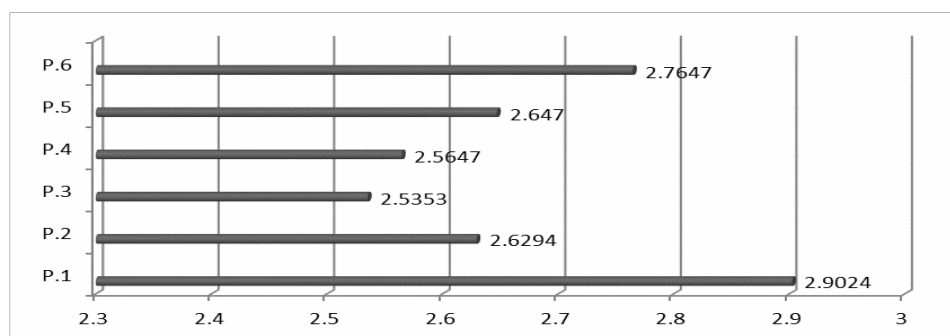
Note: P.1 - General conditions of hospital facilities. P.2 - The hospital has modern attitudes. P.3 - The facilities in hospitals are visually appealing. P.4 - The materials related to the service are visually appealing. P.5 - Cleanliness of premises, floors, toilets, etc. P.6 - The hospital staff has correct appearance.
Source: Authors.

The Fig. 2 depicts the situation in hospital according to patient perceptions about the elements of *reliability*, as another component of quality. Similarly as in the first component, all the elements are valued above the average 2.5, and in some cases even with a few points above it. The lo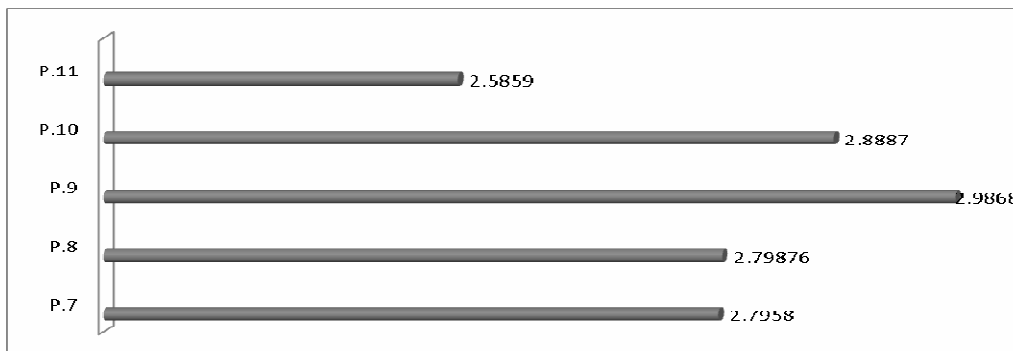west average, with 2.5859 for this component, is related to the hospital's claim to do the right thing in the first attempt. As it is noticed, the hospital in the patients' view seems to be trying to accomplish the right things from the first time, but does not always realize that objective.

Figure 2: Evaluation of Elements of Second Dimension – Reliability

Note: P.7 - The hospital promises to do something at a certain time and it does so. P.8 - The hospital offers its services at the time / schedule it is promised to do. P.9 - When you have a problem, the hospital shows a sincere interest in solving it. P.10 - The hospital insists on maintaining, processing, and disseminating accurate and error-free data. P.11 - The hospital does the right thing with the first time / attempt.
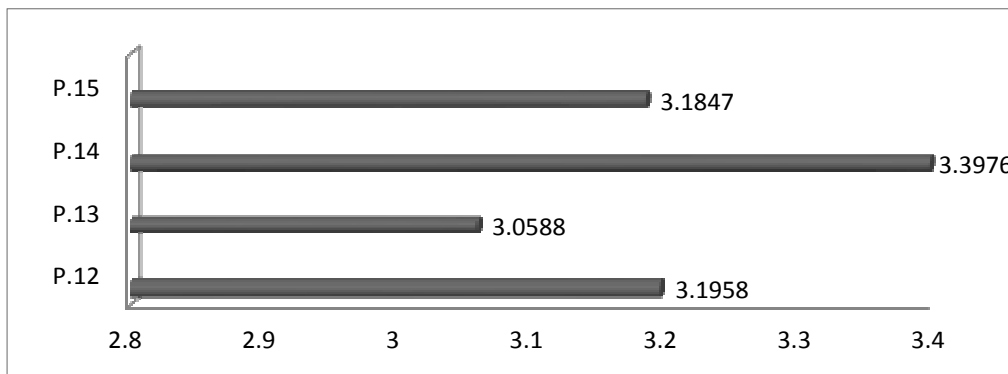*Source: Authors.*

The medically superior element, with 2.9868, is related to the sincere interest shown by the hospital in solving the patient's problems, as perceived by the patients involved in the study, seems to be relatively high. As seen from the analysis of the responses, the element of time has a special attention on the part of the hospital. This is because a considerable part of the patients who participated in the study thinks that the services are mainly offered at certain times and when the hospital promises to do something at a certain time it does so. This is further strengthened since both assertions have a focus on time, they are estimated almost the same average rating of 2.79 out of 5 possible. Apparently, the least appreciated element by the patients involved in the study is the fact that the hospital fails to make the right thing with the first attempt.

4.2.3 Responsiveness

The third quality dimension consists of questions that tend to reflect reality about the responsiveness shown by hospital staff (Fig. 3). All elements in this component are rated at an average of over 3 points out of 5, which means that this element is appreciated by the patients when they evaluate the quality of the services received, while staying in the hospital. The most valued element of this dimension, with a high average of 3.3976, is related to the high readiness shown by staff to help patients in need. The other two elements, also valued by patients with small differences between them, are also focused on time. More specifically, they estimate that the staff in most cases knows and precisely states when the necessary services will be performed, estimated at 3.1958, as well as evaluating the staff's ability to respond in a timely manner to patient requests 3.1847. However, the element with the lowest average estimate in this dimension, but with small difference from the other claims, with 3.0588 is the quick delivery. Given the estimates of readiness-related assertions, staff seems to do the maximum effort, but other conditions and factors seem to have an impact on the failure to provide services in every case.

Figure 3: Evaluation of Elements of Third Dimension – Responsiveness

Note: P.12 - The staff tells you exactly when the necessary services will be conducted. P.13 - Staff provides services quickly. P.14 - Personnel is always ready to help. P.15 - Staff responds to your requests.
Source: Authors.

4.2.4 Assurance

Fig. 4 illustrates the situation with respect to the fourth quality dimension - *assurance,* and the beliefs perceiving the patients during their stay in the hospital. It seems that this component generally has a considerably overarching estimate, where all the elements have an average rating. The element that has the highest rating in this dimension, with 3.2237 relates to the hospital staff courtesy, followed by confidence, with a significant positive estimate of 3.1015. The lowest average in this dimension: 2.7827, is the assertion about safety that patients feel from hospital services. The assertion with the appropriate medical staff's knowledge to respond to the variety of patients' questions as well as the assertion that the skills and knowledge of the staff relate to the patient, are evaluated by patients respectively with 2.8795 and 2.951 points out of 5 possible. These values demonstrate that patients appreciate the courtesy of the medical staff and generally have confidence in the skills of the medical staff in this hospital.

Figure 4: Evaluation of Elements of Fourth Dimension – Assurance
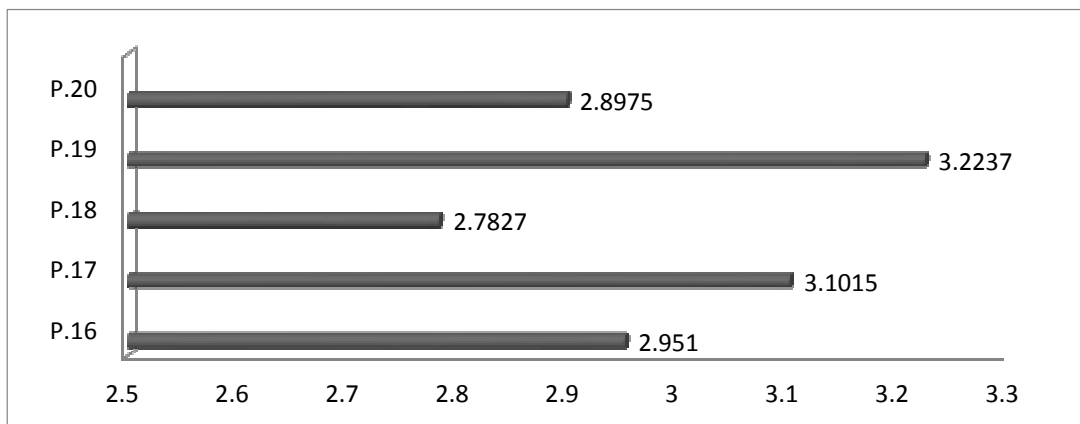
Note: P.16 - Preparing and mastering the expert medical knowledge about your treatment creates confidence in you. P.17 - Personnel brings confidence to you. P.18 - You feel safe with the services you receive from the hospital. P.19 - Hospital staff is constantly courteous with you. P.20 - Hospital staff has the right knowledge to answer all your questions.
Source: Authors.

4.2.5 Empathy

The fifth quality dimension consists of three questions, which tend to assess the perception of patients on *empathy* and sensitivity during hospital stay (Fig. 5). Even in this case, all the elements are valued above the average of 2.5 and converge at similar level. The element with highest average: 2.876 relates to the individual attention, that staff provides to the patients.

Approximately, at the same level, the second element evaluated by patients with 2.876 concerns the provision of services on an appropriate time schedule. The lowest average rating for this dimension: 2.752, is the assertion that the hospital in general has toward each patient. The patients hospitalized estimate with considerable scores the staff attention demonstrated to them as patients.

Figure 5: Evaluation of Elements of Fourth Dimension – Empathy
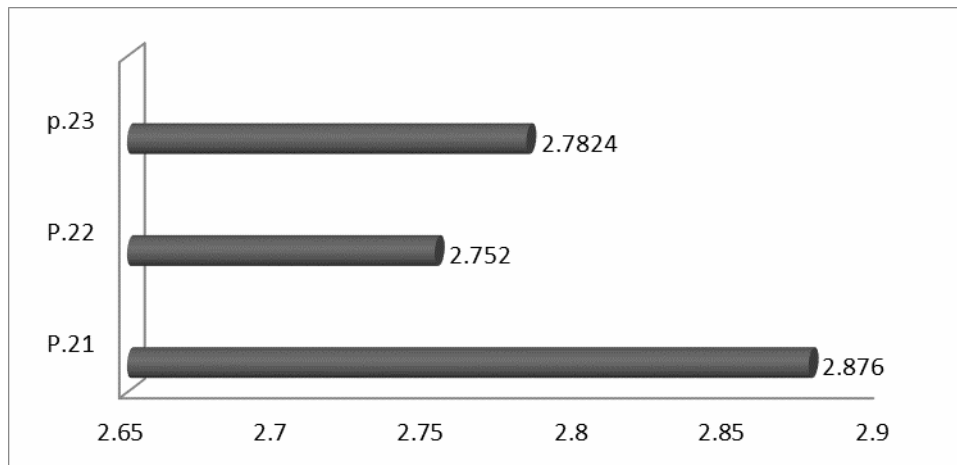
Note: P.21 - The hospital staff gives you individual attention. P.22 - The hospital has individual attention to every patient. P.23 - The service timetable delivery is suitable.
Source: Authors.

4.3 The evaluation of Durres hospital service quality

After the compilation of all answers to presents questions (Fig. 6), one could notice that the patients receiving health service during the stay in this hospital generally evaluated them as acceptable with an average rating of 2.8978 points out from 5. As seen from the graph above, each of the five quality dimensions was rated aggregately above the average 2.5 points. The more estimated dimension is that of responsiveness with an average rating of 3.21 points out of 5 possible. It is followed by assurance dimension rated at 2.99. Empathy and reliability are estimated almost the same, with small differences, respectively 2.81 and 2.80. It should be noted, when examining all dimensions in an effort to evaluate the quality, that there is a positive consideration and assessment that patients perceive from the part of hospital staff, especially their attention to the patients, their behavior and efforts to help and meet patient requirements, whenever possible. Patients, in the entirety of the quality of health care services received during their hospitalization, seem to estimate the tangibles as poorest with 2.67 points.

The tangibles weighted as one of the lowest quality dimensions by the patients, it is not new for these hospitals, even in another study conducted in the same hospital in 2015, patients rank tangibles as the last, with lowest scores, of five quality dimensions [15]. Elements of this dimension relate mainly to infrastructure, through which the hospital carries out its health care activity to the patients and apparently, no evident improvement is made by hospital.

Figure 6: Evaluation of Quality Dimensions
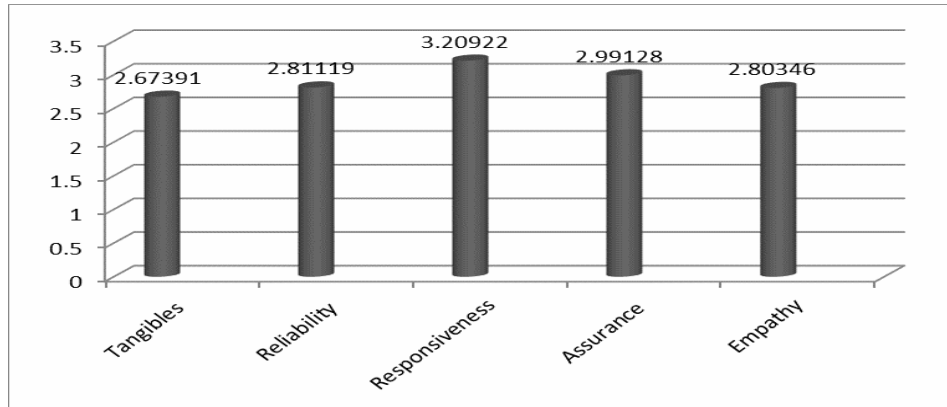
Source: Authors.

On the other hand, it is worth to emphasize that another research revealed that patient hospitalized in public hospital in Albania, evaluate tangible dimension as an important factor positively correlated with the satisfaction with the service quality [16]. This highlights the fact that hospital management should consider and demonstrate a serious engagement on investments to better conditions, refinement equipment's, facilities and cleanliness. If there is a will to increase the general visual image of the hospital more investments are needed, in order to improve them and their maintenance.

5 Conclusion

One of the easiest ways to improve the service quality in healthcare centres is to know and use the patient knowledge regarding the healthcare facilities [28]. The elaborated results of this research made it possible to present a general view out of the quality assessment of the health services that patients received in public hospitals, to further undertake a more detailed assessment of the five dimensions of quality of the services provided in the methodology. The patients receiving health service during the stay in Durres hospital generally evaluated them as acceptable with an average rating of 2.8978 points out from 5. Concluding the analysis, it is evident that from the point of view of patients, the most valued elements are the responsiveness and assurance, followed by reliability, empathy and as the last one are considered the tangible elements. It is worth emphasizing that besides the value that this work brings through the theoretical review of the field literature, the reflection of the perceived reality of the patients on the quality of hospital services, has a particularly practical value from a managerial perspective, as the results of this the study might serve hospitals managers to evince those weaknesses of the service and to further undertake those initiatives that serve as a starting point for improving the future quality of service, thereby improving the overall performance of the hospital.

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How to Evaluate the Effectiveness of Science-policy Interface: A Postmodernist Approach

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Abstract

The effectiveness of science-policy interface, and especially its evaluation, remains an elusive concept in the SPI literature. Many authors work with the so-called CRELE model which connects the credibility, relevance and legitimacy but they fail to really operationalize this model. This article explores postmodernist approaches via a conceptual analysis of the SPI theory. Building on a constructivist position of postmodernism, the principal argument is that if the social constructions of roles are being similar, the effectiveness of SPI will be higher than if the roles are constructed differently. We conceptualize the social constructions of roles with a combination of values and processes on one side and scientific information, actors, boundaries and boundary work on the other. The paper is focused on a theoretical discussion and methodological framework development for a future research. First, we clarify why it is relevant to use a postmodernist methodology. Then, we use it for a theory analysis of the SPI literature. In the conclusion, we propose a set of indicators that could be tested in a future empirical research.

Keywords: science-policy interface; effectiveness; knowledge brokering; boundary work; postmodernism; social construction.

JEL Classification: Z190

1 Introduction

The effectiveness of science-policy interface (SPI), and especially its evaluation, remains an elusive concept in the SPI literature. Many authors work with the so-called CRELE model which connects the credibility, relevance and legitimacy but they fail to really operationalize this model. Other authors have their specific understandings of the effectiveness of SPI but it often does not deal with possible ways of its evaluation. This article wants to contribute to this theoretical discussion with its own approach to the question of effectiveness – the approach based on postmodernism. Focusing on a conceptual analysis of the SPI theory, we would like to find out what a postmodernist approach can bring to the study of the effectiveness of SPI and its evaluation.

Building on a constructivist position of postmodernism, the principal argument is that we can evaluate the effectiveness of SPI by better understanding and comparing the social constructions of roles of the involved actors, both on the science and policy side of the interface, producers and users of the scientific information. The theory shows that it is not possible to adequately define the concepts of credibility, relevance and legitimacy. It means different things to different people. We argue that these different understandings are actually the only way how to evaluate if a transfer of scientific information has been successful or not. It is not relevant to find a clear definition of the credibility, relevance and legitimacy. It does not matter what they are. What really matters is how the involved actors understand it (values) and how this influences their actions (processes), in our case – how their understandings of values and processes improves or impedes on SPI. If their social constructions of roles are being similar, the effectiveness of SPI will be higher than if the roles are constructed differently. The point is that we cannot find more than this.

2   Methodology of postmodernism for the theory analysis of science-policy interface

The analytical tool which is used for the conceptual analysis of the SPI theory are notions of values and processes. A research question for the conceptual analysis of the SPI theory is what kind of indicators of effectiveness can be extracted from the SPI theory by searching for notions of values and processes which are the dominant categories in the postmodernist approach. The main reason behind the decision to use postmodernism when trying to better understand the effectiveness of SPI is its take on nature of reality, especially its emphasis on values (ontology) and processes (epistemology). Ontology contemplates about the nature of reality which depends on values. Epistemology tries to understand processes of getting to know the reality. It tries to answer the question: How can we know the world? Which is also a crucial question for SPI: How can policymakers know the world which is more and more relying on science, technology and innovations? And how these processes of getting to know the world can be effective? Postmodernism sees the world around us in a specific way. A belief that we can influence the world with our knowledge is central not only to modernism, but positivism, empiricism and science as such. But not for postmodernism which perceives our reality as a fluid phenomenon (processes) which is also different depending on from where we are looking (values). This ontological position can be regarded as a translation of Einstein's theory of general relativity into social sciences. We can never really grasp the reality given it is fluid in nature (processes). It is being continually constructed and reconstructed. It is a process based on values – not unlike politics, policymaking and SPI itself.

Postmodernism is not very popular as for some authors it equals to academic speculation and nihilism especially because of its emphasis on values and processes. Postmodernists are said to try to deconstruct narratives but not to explain their relation to the topic. Postmodernists are said to refuse a discipline of writing which they perceive as just another form of control. "To deconstruct conventional wisdoms is one thing, to state that we can function without any conventions is quite another" [10]. For Parker [10], postmodernism has no practical use because it focuses "only" on the role of language and discourse (values). Meaning is never stable (processes). It does not make any sense to try to devise empirical tools to study the reality as it would be just another part of our construction of the world and can never be used to find out the objective reality [10].

But understanding of the concepts of change (processes) and chaos (values) plays an important role in our approach to SPI. For Chia [2], we construct the world around us and create organizations in order to understand it and make it more predictable and less chaotic; e.g. through a language which is broken into many parts using alphabet. Knowledge is often almost "like a product or commodity that can be 'accumulated', 'stored' and 'transferred' in the form of unique word-configurations that we call a theory" [2]. Therefore, deconstructing these concepts and categories (values and processes) is at the core of postmodernism. The concepts are the only reality there is. Postmodernism should be seen as an alternative style of thought. "Contrary to the commonly held view, order and organization do not reflect the law of things but their exception" [2]. And this should be especially important for policymakers as they can learn more about underlying societal needs (values) and consequently better align them with their policies (processes).

A further step is done by Gergen and Thatchenkery [5] who see the benefits of postmodernism in safeguarding rigorous research methods and in increasing objective knowledge and they do so using notions of values and processes. "It is not technological capability (or "knowing how") that is called into question by postmodern critique but the truth claims placed upon the accompanying descriptions and explanations (the "knowing that")" [5]. This is a big step from the Parker's position who could not see any benefit of postmodernism for methodology. Gergen & Thatchenkery [5] stipulate that even though any methodology cannot be used to prove something to be truth (question of values), it can answer to more practical needs such as the intersection of local knowledge and social action (question of processes). They replace rational agency (values excluded) with communal rationality (values included), empirical knowledge (values out) with social construction (values in), and language as

representation (no processes) with language as action (processes). In what they call a conceptualization of research, Gergen & Thatchenkery [5] maintain that the constructivist approach brings several new functions and forms of research, such as technologies of sensitization, innovative practices of giving more voice to marginalized groups or dialogic methods – many of which are used in the SPI literature. Given critical reflexivity of postmodernism, organizations should also assume a role of giving cultural explanations and forming cultural meanings (values) in order to explain existing modes of human activity and to clarify who benefit from them (processes). In a globalized world, there is no single answer to any problem (values), left alone the fact that a problem will evolve in time (processes). "The very conception of a science in the postmodern context is one that emphasizes continuing interchange, continuing reflection and transformation" [5].

It is not a surprise that this postmodernist approach can be also traced in the theoretical approaches dealing with the science-policy interface. It is, actually, a precondition for them as they all deal with epistemological questions and reflexive methodologies. Using sciento-metrics analyses, Spruijt et al. [13] identified five clusters of authors dealing with the science-policy interface: post-normal sciences, science and technology studies, science policy studies (Mode 2 Science), politics of expertise and risk governance authors. They all deal with high stakes and epistemological uncertainties (values). To answer them, they use interdisciplinary approach, extended public and stakeholders' participation and transparency mechanism (processes). They long for more socially robust knowledge [8]. In line with postmodernism, they do not consider language to be a neutral medium and knowledge to be always objective (values). They use discourse analysis in order to answer the questions of legitimacy of research, especially scientification of society and politicization of science (processes). Researchers must acknowledge social construction and hidden normativity of knowledge. Politics of expertise deals with the power relationships between experts and policymakers. The authors study here how core beliefs of experts influence their policy preferences and how they form coalitions. Therefore, values and processes are central to SPI and our understanding of its effectiveness.

Epistemological shift from modernism to postmodernism resides mostly in the understanding of relativity (questions of values and processes). Continual changes (processes) and local embeddedness (values) prevent any theory to be universally applicable. Modernism tried to find an objective reality (values and processes excluded), postmodernism tries to understand the social construction of reality (values and processes included). In doing so, it tries to uncover implicit regime of values, which modernism took for granted, and processes where these values interact.

3 Findings and discussion of how values and processes are reflected in the theory of science-policy interface

In the previous chapter, we have identified a set of criteria (or variables) against which we can analyze the SPI literature when searching for the effectiveness and its possible indicators. In doing so, we have analyzed the SPI theory by searching for notions of values and processes and identified the following concepts:

3.1 Scientific information

When analyzing SPI, many authors deal with the notion of scientific information or knowledge if you will. This comes as no surprise as scientific information is the raison d'être of SPI. But the nature of this information is important to us when applying the variables of values and processes. Policymakers often ask scientists to advise them (to provide them with scientific information) on *complex issues*, such as biotechnology or artificial intelligence, where, however, research cannot provide a profound advice given these issues are very recent and insufficiently studied. Spruijt et al. [13] define these complex issues as "uncertain and potentially risky issues that merit a transdisciplinary approach, which indicates that these risky issues are embedded in wider environmental, social, economic and political systems" [13]. This definition includes both

values and processes as described above. Even though the world around us, in a postmodernist understanding, is permanently being constructed and reconstructed, there exists a natural longing for stability and prediction of successful science-policy knowledge transfer, or in other words, for an effective science-policy interface.

The nature of scientific information as seen through values and processes is also reflected in the CRELE attributes of credibility, relevance and legitimacy. Credibility is believability and trustworthiness of the scientific information to an end-user (policymaker). It is practically secured by a scientific method that has been used. Heink et al. [6] did a conceptual analysis of the CRELE attributes and concluded that they are good for reflection on the effectiveness but not for its evaluation. Based on an empirical semantic analysis of the relationship between the CRELE attributes, they identified many ambiguities in the concept. Their main objection is that personal dispositions are taken for granted (values). *Credibility* is what information is, how it is produced and presented (processes) which is in a real world influenced by confirmation bias (values) and availability heuristics [6]. *Relevance* or salience is a question of time, scope and scale. "Information that is timely and informs decision makers about problems that are on their agendas have high salience" [1]. Relevance depends on a user and context (values). Problematic is also its relation to novelty. The last attribute is *legitimacy* which can be defined as "the condition of being in accord with established principles" [6]. For Heink [6] legitimacy is maybe the most ambiguous concept. It can be seen as acceptance (if it is accepted after a decision was taken), acceptability (if it is in line with the accepted procedures) or justification (if it is politically right). All three attributes of CRELE are intersections of values and processes. Values are often conceptually separated from knowledge yet knowledge is based on values. Is not any evidence just a belief that something is a fact? Processes are, on the other hand, accepted as an important attributes of credibility, relevance and legitimacy.

3.2 Actors

Actors are another concept in SPI greatly involved in values and processes. Actors are often described as experts. Spruijt et al. [13] identified several factors that influence the role of an expert, namely type of issue, type of knowledge of the expert, core values of the expert, organization in which the expert works, context, and changing beliefs of experts. For them values are dominant variable in understanding the role of experts. Cash et al. [1] link actors to the CRELE attributes differently. Individuals are not independent actors. "Actors are more inclined to judge information as salient, credible, or legitimate when others already judge it as such" [1]. In this statement, processes play a more important role. Processes of delivering information between knowledge producers and knowledge users by proxy, by which they understand a scientific process, participants and also consensus. Spruijt et al. [13] argue that there is a gap between theoretical approaches and empirical studies on expert roles. Similarly, Dunn et al. [4] stipulates that the role of actors, *networks and personal interrelationships* is not covered sufficiently in the literature.

A very influential work about the self-understood roles in SPI is the book The Honest Broker by Roger Pielke, Jr. [11] who presents four ideal types of experts' engagement in policymaking. According to him, scientists can choose if they want to be *pure scientists, science arbiters, issue advocates or honest brokers*. This is a decision based on values which directly influences processes of delivering the scientific information to its audiences. Pielke assumes a postmodernist approach as he understands the limits of human cognition (values). He vows for institutionalization of science-policy interface as a way to circumvent them (processes). "Because advocacy is often a default role and it is so seductive, there is a need to support the institutionalization of mechanisms of science arbitration and honest brokering" [11]. On the other hand, Pielke does not recognize knowledge brokers as a separate group. For him, scientists engage in knowledge brokering on top of their main duties. For others, nevertheless, *knowledge brokers* are unique entities. "Knowledge brokers are people or organizations that move knowledge around and create connections between researchers and their various audiences… but they also produce a new kind of knowledge: brokered knowledge" [9]. Given its interdisciplinary nature, knowledge brokers can be various entities, such as individual experts

(e.g. policy entrepreneurs, science journalists) or organizations (e.g. academies of sciences, technology transfer offices).

3.3 Boundaries

The next concept identified in SPI theory with values and processes are boundaries. For Cash et al. [1], (values and processes) boundaries are "barriers and gaps in knowledge-action systems [which] demarcate the socially constructed and negotiated borders between science and policy, between disciplines, across nations, and across multiple levels" such as *functional activities, political jurisdictions and organizational scales* [1]. They identified these different perceptions and points of emphasis in the analysis of water management in the U.S. Great Plains. *Language or jargon* is an example of a barrier between such groups. Spruijt et al. [13] describe also a "science-policy gap" which stems from different preferences (values) of policymakers and scientists and which creates boundaries between them. Policymakers prefer certain solutions while scientists can offer them only probable explanations. Science-policy interface should bridge this gap, which is, however, often an uncertain exercise with an open end (processes).

Boundaries are also created by institutions and organizations which are a translation of values and processes into a set of formal and informal rules [1]. Dandridge, Mitroff & Joyce [3] studied the *organizational culture* and symbolism which refers to the symbols that the members of an organization use when referring to feelings, images and values. These can be either stories or myths, ceremonies or ritualized events, logo and anecdotes or jokes. According to the authors, these are of the same importance as traditional topics such as reward systems, organizational structures, individual use of power etc. From the perspective of symbolic interpretivism, Dandridge, Mitroff & Joyce [3] see three main functions of symbols, namely in their capacity to describe the system (values), to control the energy flow within it and to maintain the system and its modifications (processes).

3.4 Boundary work

Boundary work, [7] boundary spanning, [12] or knowledge brokering [9] combine values and processes in yet another concept. For Cash et al. [1], boundary work stands for balancing *trade-offs* and working with tensions and complementarities. "What makes boundary crossing difficult is that actors on different sides of a boundary perceive and value salience, credibility, and legitimacy differently" [1]. Pülzl and Rametsteiner [12] identified two processes in boundary spanning: transfer and transaction. Transfer is a linear process, transaction a collaborative one. Dunn, Bos & Brown, [4] who had studied Melbourne's water sector, broke the linear process into two separate processes depending on its initiator. In the *science-push* model, the agenda of research is set by scientists only, without any involvement of society. This model is in line with positivist approach and methodology. The main motivation for research is to find knowledge, not to apply it, which is somehow similar to the Pielke's pure scientist. It is a linear process. This model is considered to be outdated as it deals only with the supply of information, works with fixed boundaries between science and policy and expects science to be neutral – in doing so it overlooks "values, ethics, organizational culture, regulatory environment, resources, bargaining and entrenched commitments" [4]. In the *policy-pull* model, the agenda of research is set by policymakers who commission scientists to research an issue and provide evidence for better addressing a problem. It is also a linear process where knowledge is transferred directly from scientists to policymakers. On the other hand, in the *co-production* model, an agenda of research is set jointly by scientists and policymakers with involvement of stakeholders and citizens. Research questions and methods are being defined in a continuous dialogue between them. This model "requires mutual trust, respect, reciprocity, participation and commitment from all those involved" [4].

Cash et al. [1] combine the concepts of boundaries and boundary work in what they call boundary organizations but, interestingly, they stipulate "that is often individuals who have legitimacy or credibility on both sides of a boundary that are especially useful in making this bridge" [1]. They also list processes that any boundary work should include (based on a

combination of values and processes): accountability, use of boundary objects, participation, mediation, translation, coordination and complementary expertise. Individuals in a boundary work are knowledge brokers who combine concepts of actors and boundary work.

Within the identified concepts of scientific information, actors, boundaries and boundary work, we can thus further identify possible indicators which can be tested in a future research. These indicators are listed in Table 1 below. Based on the postmodernist methodology, they represent a combination of values and processes used to identify the core concepts in the SPI theory. An indicator either combines both notions of values and processes or relates to only one of them. Sometimes, however, the line between these two categories is blurred.

Table 1: Identified indicators

Scientific information	Actors	Boundaries	Boundary work
Complex issues	Pure scientists	Organizational culture	Science-push transfer
Credibility	Science arbiters	Language and jargon	Policy-pull transfer
Relevance	Issue advocates	Organizational scales	Co-production transaction
Legitimacy	Honest brokers	Political jurisdictions	Translation
	Knowledge brokers	Functional activities	Mediation
	Networks and personal interrelationships		Trade-offs

Source: Author.

4   Conclusion

My research seeks to contribute both to the interdisciplinary research of science-policy interface and also to postmodernism on which ontological and epistemological positions it stands. Within the scope of this paper, I have used the notions of values and processes as an analytical tool for the conceptual analysis of the SPI theory. My research question was to find possible indicators of effectiveness which can be extracted from the SPI theory and which can be further tested in a future empirical research. Postmodernism identified values and processes as the predominant factors in understanding the world around us. Existing SPI theory [13] pointed to a gap between theoretical approaches and empirical studies on expert roles in the process of scientific advice to policymaking, which is understood here as a practice of boundary work [7] and knowledge brokering [9] that deals with complex issues and uncertainty [13]. We want to bridge this gap with our take on the effectiveness which, given our postmodernist approach, we understand differently than it has been defined in the SPI literature. Heink et al. [6] defined the effectiveness in the context of SPI as "the ability to influence the behavior of intended audiences by enhancing their knowledge of the consequences of their decisions." [6]. For Cash et al., effectiveness is "how problems are framed, how concerns are addressed and how policy options are considered" [1]. For Pülzl and Rametsteiner [12], the effectiveness depends on the model of SPI interaction.

I claim that we can evaluate the effectiveness of SPI by better understanding and comparing the social constructions of roles of the involved actors, both on the science and policy side of the interface, producers and users of scientific information. After applying the criteria of values and processes on the SPI theory, I have identified four areas of possible indicators of effectiveness. I have conceptualized social constructions of roles with combination of values and processes on one side and scientific information, actors, boundaries and boundary work on the other. Through this matrix I have created a list of indicators based on which I will test my

hypothesis which says that if the social constructions of roles are being similar, the effectiveness of SPI will be higher than if the roles are constructed differently. I will test this hypothesis with qualitative in-depth interviews in the selected case studies. Having said that, I will not test the quality of indicators themselves. My goal is not to prove which indicators contribute to higher effectiveness of SPI. My claim is that if the understanding of an indicator is the same, scientific information will be transferred from knowledge producers to knowledge users effectively regardless of the fact that the indicator in question scores high or low in the credibility, relevance and legitimacy model, or any other. My point is that a high level of understanding between the involved actors on bad quality indicators is actually better for the effectiveness than a low level of understanding on good quality ones. I claim that what really matters is understanding on values and processes as such.

4.1 Future research

For the purposes of my research, I will need to compare the social construction of the involved actors. These actors will be individuals as individuals create social constructions. As I will need to compare the social constructions of individuals from the both sides of knowledge transfer, knowledge producers and knowledge users, I will need to select two categories of these individuals for each particular case study. The first category of the analyzed individuals, the so called knowledge producers, will come from the field of boundary work as defined in the theory [1]. These individuals could be working either as individual knowledge brokers or policy entrepreneurs, or they can be employees of boundary organizations as defined in the theory. The second category of the so called knowledge users will come from the pool of decision-makers associated with the first category of actors. These decision-makers must be jointly involved in particular case studies with the individuals of the first category. I will identify the pairs of individuals from the first and second category whose social constructions will be compared in order to prove my hypothesis.

I intend to collect empirical data from qualitative in-depth interviews with the identified individual actors from both the knowledge producers and users side. The interviews will be transcribed and analyzed following the methods of iterative coding and qualitative content analysis. I expect the result of this research to be a model for comparison of the social constructions of the involved actors at science-policy interface with which we would be able to better understand concepts and social constructions that exist around particular science-policy interfaces and to better evaluate the effectiveness of these processes. We would be able to better understand framing of an issue and roles of the involved experts and organizations. With this in hand, practitioners would better understand which particularities are of importance and they would work more with them. Consequently, this should enable better aimed communication between knowledge producers and knowledge users. They should also be able to better understand processes and factors that influence knowledge producers and knowledge users (e.g. individual psychological characteristics, social group norms, organizational culture) and the nature of scientific information itself.

Acknowledgements

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Innovative Ways of Citizen Participation
in Delivering Public Services

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Abstract

The development of new technologies, social media and web 2.0. enable, inter alia, to address the problem of ineffective providing of public goods (free-rider problem). Thanks to growing connectivity it is now easier than ever for individuals to collectively contribute with ideas, time, expertise, or funds to public policy projects. This collective action is crowdsourcing. Crowdsourcing is the practice of engaging crowd for a public interest, primarily online through social media and crowdsourcing platforms, and leverage their networks for greater financial support and advocacy initiatives with a social impact. The goal of the paper is to introduce the crowdsourcing as the possibility to correct public service delivery failure and to identify the crowdsourcing development factors. The method of survey experiment is used to demonstrate the provision of public goods through crowdsourcing in community centre. The outcomes of research can be useful for government in public service charging and for non-governmental organizations in donations opportunities identifying.

Keywords: Citizen; Crowdsourcing; Participation; Public services.

JEL Classification: C93, D12, D64, H41

1   Introduction

Innovative answers how to solve this public sector failure, i.e. how to produce and finance public goods, intended to enhance public values such as effectiveness, efficiency, and legitimacy, can be found through collaboration with different stakeholders, delivering interesting social innovations [17]. This inefficiency rate can be reduced by introducing alternative ways of securing public goods based on voluntary cooperation, crowdsourcing.

Crowdsourcing [11] is defined as an open call, essentially through the internet, for the provision of financial resources either in form of a donation or in exchange for some form of reward and/or voting rights, in order to support initiatives for specific purposes. In the context of this paper, we work with the definition that crowdfunding is an emerging source of funding involving open calls to the public, generally via the Internet and ICT, to finance projects through donations and monetary contributions in exchange for a reward, product pre-ordering, lending, or investment. Crowdsourcing is then also receiving a non-monetary contribution (e.g., information or input) into a task or project by using the services of a large number of people, typically via the Internet.

Crowdsourcing has been used for various projects in the profit and non-profit sectors; in this paper, we focus on its use in the public sector to solve the public-sector failures in the field of community development.

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

Bounded rationality [15] reflects the limited cognitive abilities that constrain human problem solving. Within bounded rationality, we identified several factors acting on individuals [7]: messenger, incentives, norms, defaults, salience, priming, affect, commitments and ego.

Demographic and behavioural similarities between the individual asking for help and recipient can improve the effectiveness of the request (messenger) [4], [7], [8].

Incentives such as fear, fiscal policy, the size of the public sector and information can affect how individuals respond to incentives. Crowdsourcing uses positively tuned instructions, which, as it were, force the "altruism" or highlight the benefits of collaboration on the individual and thus achieve a higher degree of voluntary engagement, as well as public policy-making experiments with negatively tuned instructions by means of sanctions. Regarding the perception of risk [7], also suggests that it is important for individuals to have an overview or know what their money was used for, or when their money was used. Individuals want to know what they can do rather than what prevents them from doing so. Campaigns set through crowdsourcing are time-limited, and those involved are always informed about the results.

Also, social and cultural norms such as social rules, moral duty, religious duty, conscience and relationship to the recipient beneficiary affect in positive or negative way the willingness of people to voluntarily pay or help. People often take their understanding of social norms from the behaviour of others, which means that they can develop and spread rapidly [7], [12].

The situation where we can encounter the effects of this factor is, for example, when contributing to a "charity" collection. For example, if a given NGO has a set, or default monthly amount of voluntary contributions, it may happen that individuals will not increase their contributions retrospectively [7]. Crowdsourcing and especially crowdfunding determines different support options and varying amounts of financial contributions to eliminate the default effect.

Salience explains why unusual or extreme experiences are more prominent than less constant experiences [7]. Peak moments or final impression can influence whole events. In other words, individuals prefer three hours of steady discomfort in dentist over the one who gave us sharp pang of pain, because that pain is particularly salient [7].

According to [7], the questions if an individual is ultimately influenced by a particular behaviour depends on the environment – priming [1], [9], where the individual is influenced by, what the individual sees, hears or feels when it comes to spreading the message or, in the sense that an individual imitates what they see or hear [6]. The reason for this behaviour, imitation, is that the individual has a "need to belong" [2], [3], [13], i.e. does not want to be alone, wants to be accepted by society. Social networks make this largely possible, crowdsourcing also contributes to community building.

Affection is a powerful force in decision-making. People in good mood make unrealistically optimistic conclusion, whilst those in bad mood make unrealistically pessimistic conclusion. Research even proves that appropriately chosen words for success such as winning, succeeding, overcoming, mastering, and others lead to better results than the use of aggressive words such as defeating competition, and reaching the goal [4], [6].

The individuals seek to be consisted with their public promises and reciprocated acts. If the promise is linked to financial or social costs (damage to reputation), an individual is more willing to fulfil his obligations [7].

Individual behaviour is also limited by selfish interests. Bounded self-interest incorporates the comforting fact that people are often willing to sacrifice their own interests to help others [15]. The individual acts in order to have the best possible feeling about themselves (ego). Individuals tend to behave in a way that supports the impression of positive and consistent self-image [7].

The paper focused on factors that influence the willingness of individuals to voluntarily pay for public goods and whether there are mechanisms that increase their willingness to voluntarily pay.

2 Material and Methods

The goal of the paper is to introduce the crowdsourcing as the possibility to correct public service delivery failure and to identify the crowdsourcing development factors.

During the experimental survey, we cooperated with the community centre. Therefore we have chosen community centre as a public good in our experimental survey. A frequent problem of experiments is a non-representative selected sample that does not allow generalisation of the achieved results. The experiments usually focus on testing the responses and behaviours of university students. The reason for the use of students is the low-cost of setting up the test group and the assumption of greater interest and motivation when testing students [16]. In contrast, the advantage of the survey experiment is that the experiment is administered to a representative population sample [10], [16]. 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 [5], [16]. This is because manipulation of one feature of the scenario will generally change subjects' beliefs about other features of the scenario [5].

The research hypothesis: The willingness of the consumers to pay voluntarily for public goods is dependent on the payment mechanism.

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

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

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

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

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

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

3 Results and Discussion

We have set the main research hypothesis in work, which we will try to verify in the next part. The main research hypothesis: The willingness of the consumers to pay voluntarily for public goods is dependent on the payment mechanism.

We used the chi-square test to verify the selectivity of the sample in relation to the base file. We found that the selected sample is representative for all sorting characteristics, e.g. gender, age category and the highest achieved education (p-value 0,959; 0,973; 0,559). The results found in the survey can be generalised for all inhabitants of Slovakia.

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

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

Source: Authors.

At the beginning of the experimental survey, we asked respondents whether they have ever visited the community centre. Only 68 respondents of 368 answered positively, meaning they labelled answer "yes". 48 respondents visited the community centre in consequence of someone's recommendation (for example, parents, friend / girlfriend, priest, and other acquaintances). Respondents most often visit the centre with their friends (48.5% of respondents), alone (29.4%) or with their child / children (11.8%). By visiting the community centre, the respondents were able to create a new friendship (55.9% of cases), gain a new knowledge (29.4%), skills (19.1%), they spend their free time more efficiently (32.4%), they

were not alone (14.7%), they could relax (25.0%). Only in 10.3% of cases respondent choose the possible "I gained nothing".

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

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

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

The following table (Table 2) shows the willingness of individuals to voluntarily pay for community centre according to selected mechanism.

Table 2: Comparison of selected mechanisms

		Voluntarily	Partly voluntarily	Involuntarily
Willingness to pay	Contributed	152	172	95
	Not contributed	216	196	273
Regularity of contribution	One time	27.63%	25.00%	
	Annually	30.26%	41.86%	
	Semi-annually	18.42%	13.37%	
	Monthly	20.39%	18.02%	
	Other	3.29%	1.74%	

Source: Authors.

The results in the table show that the respondents most often chose the annual contribution period (118 respondents in total). In the case of the last mechanism, we did not ask respondents how often they would like to contribute regularly, because the regularity of the contribution was given in the phrasing of the question itself (every month during the 5 years). For each mechanism, we asked respondents how much they are willing to pay for a community development project. The following table (Table 3) contains the basic descriptive statistics for selected mechanisms.

Table 3: Basic descriptive statistics for willingness to pay in €

Mechanisms	Description	Average	Median	Std. deviation	Min	Max	Total
Voluntarily	Free rider	35.85	20.00	62.16	0.10	500.00	5,342.00
Partly voluntarily	Utility maximization	42.02	15.00	126.66	0.05	1,500.00	7,228.05
Involuntarily	Forced consumption	41.22	20.00	67.97	0.05	500.00	3,915.50

Source: Authors.

Significant correlations were observed between selected mechanisms (Table 4).

	Voluntarily	Partly voluntarily	Involuntarily
Voluntarily	1,000		
Partly voluntarily	0.796**	1	
Involuntarily	0.617**	0.519**	1

Source: Authors.
*Legend: ** Correlation is significant at the level 0.01 (2-tailed)*

We asked the respondents what influenced their decision to voluntarily pay for community development project. The factors which affected the decision-making process of respondents are shown in the following tables (Table 5 and Table 6).

Table 5: Motives for voluntary payment for community development project

Factors	Reason	Voluntarily	Partly voluntarily	Involuntarily
Incentives	The state doesn't solve the problem	14.47%	14.53%	18.95%
Affect	Feeling satisfied with promoting good things.	35.53%	30.23%	34.74%
Priming	My family, friends and acquaintances are paying, therefore I am doing it too.	4.61%	6.98%	9.47%
Defaults	The project caught me. It is a current problem in Slovakia.	9.21%	13.37%	18.95%
Salience	When we cannot help ourselves, nobody can help us.	14.47%	16.86%	16.84%
Messenger	I want better life for my relatives.	7.89%	6.98%	1.05%
Norms	The society should deal with it.	13.16%	11.05%	0.00%
Ego	I would like to make myself visible.	0.66%	0.00%	0.00%
	Other	0.00%	0.00%	0.00%

Source: Authors.

The main reason why individuals chose to voluntarily pay for community project is warm-glow effect. This reason chose almost 140 respondents. Only the reason "I want better life for my relatives" had significant influence on the amount of payment (p-value 0,019, r_s = 0,192).

Table 6: Motives for non-payment for community development project

Factors	Reason	Voluntarily	Partly voluntarily	Involuntarily
Priming	The project does not interest me.	9.26%	12.76%	5.86%
Salience	I do not see why I should make a "job" of the state or municipality	22.22%	21.94%	17.95%
Affect	I do not believe in such a project	16.67%	19.39%	6.96%
Defaults	I am not interested in answering.	15.28%	18.37%	13.92%
Norms	I voluntary pay for other activities, projects.	8.33%	6.63%	2.56%
Messenger	I do not need a community development	9.26%	13.78%	0.00%
Ego	I do not need to make myself visible.	12.04%	7.14%	0.00%
Commitments	I do not see why the state should command anything	0.00%	0.00%	27.11%
Incentives	The tax burden is too high; the state should better reallocate financial resources.	0.00%	0.00%	22.71%
	Others	6.94%	0.00%	2.93%

Source: Authors.

The main reason why individuals would not voluntarily pay for community development project is that they do not see why they should do a "job" of the state or municipality.

We examined that there is a relationship between the characteristics of individuals (gender, age category, the highest obtained education, economic activity, earnings) 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.

For younger individuals, a satisfactory feeling of giving a voluntary payment is important, while for the elderly it is important to have a better life for their relatives (p-values 0.050, 0.027, r_s = -0.159, 0.180). Individuals with higher education will voluntarily pay for the project while addressing the current issue, while individuals with lower education will choose to contribute because "When we can't help ourselves, nobody can help us." (p-values 0.023; 0.028; r_s = 0.184; -0.178). For the individuals with higher income is important whether the project solves the current problem in society or not (p value 0.012, r_s = 0.204). For lower-income individuals, a state's compulsion to pay for a community development project is a systematic solution of the problem (p-value 0.037; 0.037; r_s = 0.215; 0.215). The dependence between socio-demographic factors (age category, the highest obtained education, earning) were evaluated by Spearman's correlation coefficient. We used Cramer V for evaluation relationship between gender, economic activity and willingness of individuals voluntarily pay for community project. According to the results of some experiments, women are more socially oriented than men are, and therefore realize that the need for community development is a social problem that needs to be solved (p-value 0.021, Cv = 0.176). The economic activity of the individuals influenced the reason "I want a better life for my relatives" (p-values 0.040, 0.003, Cv = 0.277, 0.321).

4   Conclusion

The goal of the paper was to introduce the crowdsourcing as the possibility to correct public service delivery failure and to identify the crowdsourcing development factors. Crowdsourcing can be successful only on condition that the activities the project/campaign offers are beneficial for the community, thus contribute to society's sustainable development. For the public good, for which we conducted a survey, we set up community development project. Another condition for success is to build a community and/or create a network of contributors who are willing to contribute in monetary or non-monetary form so the campaign would be fulfilled and the project realised. In our case, we introduced to individuals three ways in which they can voluntarily pay for) a community development project.

The most efficient mechanism was the "partly voluntary" mechanism when the municipality set up a fee for access to activities undertaken by the community centre. In this case, the consumer pays only for the goods he actually consumes and benefits from.

Crowdsourcing builds on many principles used in creating effective public policies, there are several joint factors discussed in this paper (messenger, incentives, norms, defaults, salience, priming, affect, commitments, ego) [7].

Individuals were influence by all factors except for ego factor in the case of voluntary mechanisms. For an individual, for example, it is important to become part of a certain group of people by helping them.

If we take a mechanism where the decision of an individual is partially voluntary, besides the factors of ego and defaults, the decision of individuals is influenced by all factors. For example if there are certain activities an individual is interested in, he / she may not necessarily ask to pay, but does so arbitrarily in his / her own interest [14].

In a situation where an individual is forced by the state to contribute to some activity in the form of an increase in the tax burden, his decision is influenced only by the commitment factors. Individuals were aware that if they did not meet their obligations to the state, they could incur additional financial costs. On the other hand, the activity carried out through community development projects should contribute to increasing the welfare of the individual.

Yet, crowdsourcing uses the power of a crowd and thus has more effective results than just implementing public policy.

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Optimization for Minimal State: Case Study of Bureaucracy Ratio in Czech Armed Forces 1997 -2017

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Abstract

The limited possibilities to compare the inputs with the outputs build a barrier for the efficiency assessment in some segments of the public sector. The sphere of external safety undoubtedly ranks among those segments of the public sector. The alternative way of assessment can be formed by the analysis of alternative aggregates. The efficiency of the economic management of public funds is, among others, determined by the personnel structure optimization which can be one of the alternative indicators. Optimizing of personnel structure was one of the transformation goals of Czech Armed Forces. By use of personnel optimization indicator which is based on the ratio between soldiers and civil employees was possible to track the dynamic of transformation as well as the transformation goal fulfilment. The rate of personal optimization ratio drop in time of transformation, which had been caused by the change of the system and was replaced by the increase in the utilization of the apparatus in the following years. Since 2009, the proportion of the supportive bureaucratic apparatus has been exceeding the values from the late 1990s and it still shows increasing tendencies. Due to this result we can evaluate the fulfilment of one several pre-transformation goals.

Key words: external safety, efficiency, transformation, army, utilization

JEL Classification: G3; H5; N4

1   Introduction

As a specific economic segment, the public sector itself is broadly diverse. From the view of its function, each area of this sector is unique and it is not possible to determine its value with exactitude [3]. The non-definable link between both the value and the price of services provided is typical namely in the areas which represent the functions of a so-called minimal state [8], [6]. Traditionally, the minimal state consists of internal and external safety, judiciary and the bureaucratic apparatus of the state [21]. The discontinuity between the services and their value restricts the use of the tools, which are commonly applied in the private sector for measuring the economy of performance and spent funds. In order to identify the changes in performance and the results of structural changes within the public sector, we have to work with alternative indicators. These alternative indicators are not limited to the comparison between inputs and outputs, but they use the nonfinancial aggregates between the functioning of the institution and its performance [4].

The nonfinancial aggregates are one of the options how to state the goal and measure its fulfillment or to track the dynamic of structure transformation. This work will apply one of the nonfinancial indicators to the Ministry of Defense, which is representative of minimal state segment and has undergone a substantial system change during twenty recent years. This aggregate is based on the optimization of personnel structure of Ministry of Defense, which consist not only bureaucratic and supportive apparatus, but all armed forces. One of the transformation goals, which were state by Czech Armed Forces in pre-transformation strategy, was to optimize the personnel structure. They state, "*in peacetime the number of professional soldiers decreases to 34,000 – 36,000 and the number of civilian employee will be less than 10 000*" [14]. If we track the fulfillment of this goal, we can state that the final rate between the civilian employee and soldier should be higher than 3.4 soldiers per civilian employee. With the respect to this goal, we will use the personnel rate to track the dynamics of transformation. The aim of

this work is to track transformation of Czech Armed Forces by using personnel structure ratio and to show the degree of fulfillment of the state goal.

The structural change, which is the reason for tracking the dynamic of change, consisted the transformation of the army with compulsory military service into the professional army. Based on available data, the indicator should illustrate the change in the utilization of the apparatus before the transformation and in the decade following the transformation. The army is an ideal item for applying alternative indicators because it is traditionally considered a non-productive part of economy with a specific role in society [10]. Both the specific position and function of the army naturally create a barrier for applying the tools, which are commonly used for efficiency and performance measurements in the private sector.

If we want to avoid assessing the efficiency of the funds spent on military activities, we can focus on the personnel structure optimization. Ministry of Defense has two main groups of employee. The first group are armed forces and the second are civilian who represent the bureaucratic and supportive apparatus. The cost of bureaucratic and supportive apparatus accounts for more than 20 percent of all costs. In the longer term, we can follow the changes in the utilization of such isolated segment of the Ministry. In the longer term, the utilization rate of the supportive bureaucratic apparatus is an important indicator in the context of the structural transformation of the army with compulsory military service into the professional army. In the long run, this indicator should depict the extent of change in the utilization of the supportive bureaucratic apparatus in the context of the transformation. The indicator is followed in the period of twenty years, starting in 1997 and finishing in 2017. In the initial stages of the analyzed period we can speak about the independent Czech Army which came into existence in 1993 by splitting the Czechoslovak Army into the Czech and Slovak Armies. The 1990s can illustrate the situation before the beginning of professionalization. The process of professionalization started with gradual decrease in the number of the compulsory military servicemen at the beginning of the third millennium. It culminated on 22 December 2004, when the last compulsory military servicemen were discharged from the army and only professional soldiers remained [15]. Proceeding from the indicator's development of the values after the transformation, it is possible to confirm the influence of the transformation on the utilization of the supportive bureaucratic apparatus and so the degree of goal fulfillment.

2   Material and Methods

The measurement of the personnel optimization rate of the supportive bureaucratic apparatus and professional soldiers, as well as the measurement of its changes in the course of time, is based on the data of the Ministry of Defense. These data depict the personnel structure in the defense department. The key sources of information about the personnel structure are the following documents: *Personnel Size of the Defence Department in 1992–2017* [17] and the NATO document called *Defence Expenditure of NATO Countries (2010–2017*) [22], which contains information about the share of expenditures on individual NATO armies' areas. If we have a look at the structure of the Ministry's expenditure, we find out that more than half consists of personal costs [22]. The data about both the Ministry's and army's personnel structures refer to the proportion between the military and civilian personnel. In the civilian personnel, it ranged from 24 percent to 44 percent in 1997–2017 [17].

The method of this article lies in comparison of the pre-transformation goal and the reality in time. This indicator is based on the following hypothesis: If the proportion between soldiers and supportive bureaucratic apparatus is low, there are idle capacities. However, to be methodologically correct, we must also admit the weaknesses of this hypothesis. The first weakness is the issue of delegating activities between the military personnel and the supportive bureaucratic apparatus. Here, we are not able to define the accurate extent of the military personnel's independence when administering bureaucratic affairs. But we will accept the state goal of pre-transformation document, that the ratio should be higher than 3.4 soldiers per one civilian personnel. Another restriction lies in the absence of the ideal value for the ratio of

soldiers to the employee of the supportive bureaucratic apparatus. One extreme example can be its idle capacity; the second can be insufficient staffing.

3 Results

Personal costs are the biggest part of the Ministry's expenditures. In 1997–2017, they ranged between 50 and 62 percent [22]. We can only talk about the statistical relationship between the amount of funds and the number of staff since 2004, when the statistically significant correlation of 0.65 was identified. The relationship analysis of allocated funds to the staff number indicates the role of mandatory expenditure in the budget of the Ministry of Defense. The development of the staff numbers in the Ministry, as well as its budget, is depicted in graph n. 1. Proceeding from the partial analysis of the importance of personal expenses, we confirm the hypothesis about the existence of the relationship between the funds allocated for the Ministry and the number of staff in the Ministry's department. Due to this fact, the higher rate of the supportive bureaucratic apparatus' utilization can be understood as saving personal expenses.

Graph 1: The Budget of the Ministry of Defense and the number of staff 1997–2017
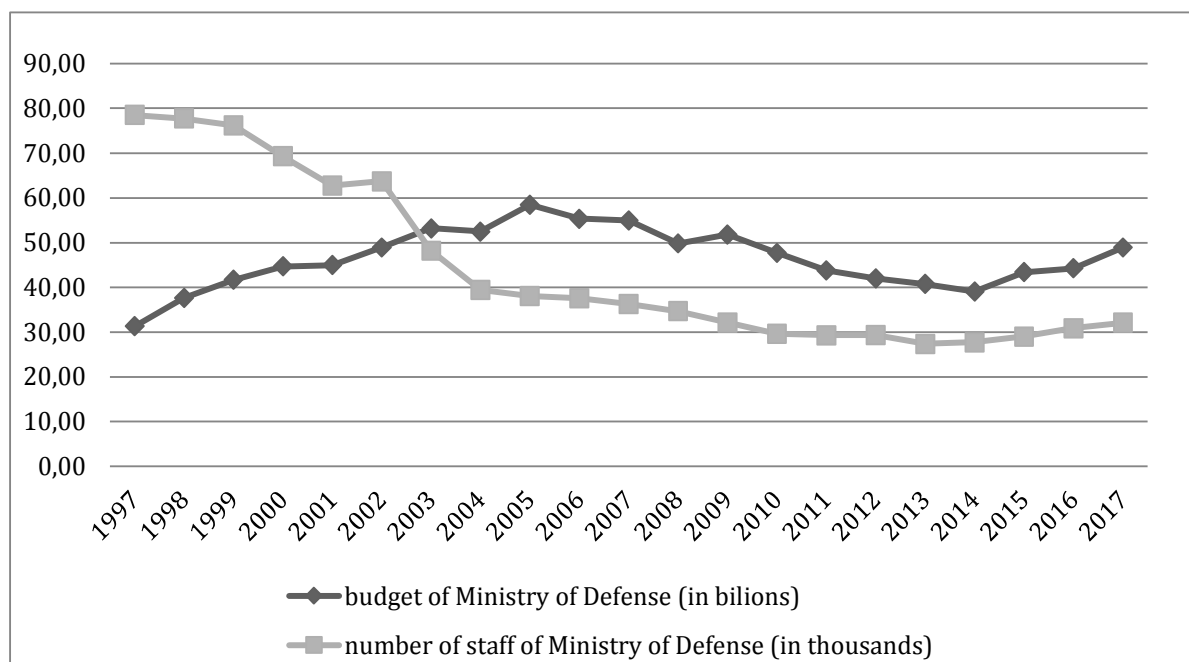
Source: Author.

Until 2004, the Ministry's staff had been divided into professional soldiers, civilian employees and compulsory military servicemen. From 2005 to 2014, after the transformation of the Czech Armed Forces into a fully professional army, there were only two categories of staff: professional soldiers and civilian employees. On the basis of *the Act on Civil Service No. 234/2014 Coll.* [23], a new category was introduced on 1 July 2015: the category of the state employee. For the purpose of our analysis, this category is—in terms of function—identical with that of the civilian employee. For this reason, both categories have been included in the category of the civilian employees since 2015.

The development of the Ministry's staff number by individual categories is depicted by graph n. 2. The total number of soldiers had noticeably decreased until 2004. This situation was caused by the gradual reduction of compulsory military servicemen by 2004, when compulsory military service was cancelled. Since 2004, the category of professional soldiers has been identical with the category of all soldiers. Since 1997, the number of professional soldiers has exceeded 20,000. It reached its peak in 2007, when the total number of professional soldiers was

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24,334 [17]. In the category of civilian employees who represented the supportive bureaucratic apparatus, we observed almost steady staffing in 1997–2003, irrespective of the total army count. After 2004, the decreasing trend of this staff category was clearly visible. The cause of this reduction could be found mainly in the structural change of the army, as well as in the optimization of the supportive bureaucratic apparatus' utilization.

Graph 2: Staffing (1997–2017)
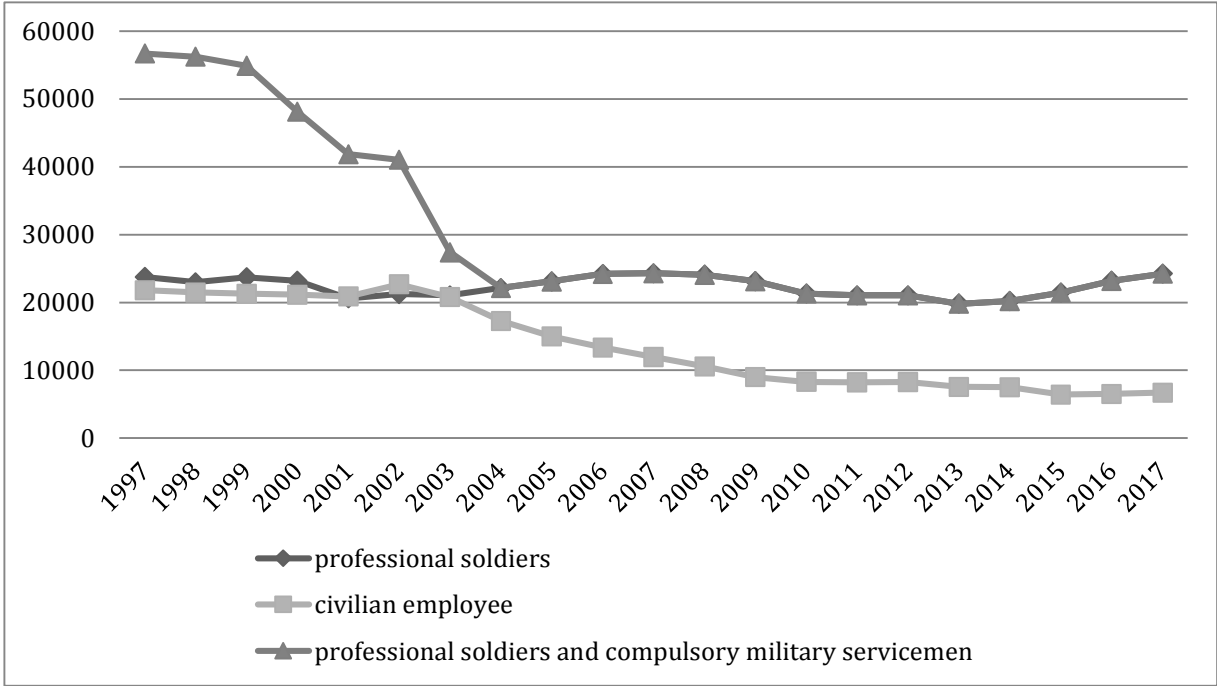
Source: Author.

The number of military personnel assigned to an employee of the supportive bureaucratic apparatus can be constructed as a ratio to all the soldiers, as well as a ratio to professional soldiers only. In order to clarify these differences, in graph no. 3 we give the values of the indicator for both categories in 1997–2017. If we look at the values of the indicator before the structural change and after the transformation of the army, it is obvious that the system change of 2004 caused a short-term reduction of the supportive bureaucratic apparatus' utilization in the relationship to the number of all the soldiers. However, the utilization of the apparatus increased again in the following period. The lowest values of the apparatus' utilization were reached in 2004, when there were 1.24 soldiers per one civilian employee. In contrast, the apparatus' utilization in 2017 was 3.08 soldiers per one civilian employee. If we compare the year 1997 (when there was the army of an old type) with the year 2017 (when there is a fully professional army), the differences in the indicators make 0.48 soldiers per one civilian employee. If we compare the pre-transformation goal of rate between the civilian employees and soldiers, which says that, the ratio should be higher than 3.4 we can say that the rate from 2017 is close to this goal but does not fulfill it. The dynamics of transformation shows the positive development of this ratio, which can reach the fixed rate of 3.4 in future.

Graph 3: The number of military personnel per one civilian employee 1997 – 2017

the number of professional soldiers per one civilian employee

the number of all military personnel per one civilian employee

Source: Author.

4 Discussion

For completeness of the study is necessary to open discussion about the predictive value of alternative indicators in context of public sector transformation. Naschold and Otter [19] differentiate several types of public transformation due to the core and speed. One extreme case of transformation is natural transformation, which is connected with environment development and is not primarily planed. Planned transformation has from its own substance several consecutive phases. Authors show how important is to track the transformation due to the different dynamic, which can affect the effect of transformation. Wilson, Roscigno and Huffman [24] focused on the personnel transformation due to the equation of civil rights in USA track the dynamics by using few nonfinancial indicators and shows how important this analysis was. Criticism of non-financial aggregates see the weak point in the facts that in general are this aggregate based in one-criterion evaluation [5].

In fact, the rate of professional soldiers and civilian employee is also one-criterion method, but the purpose of using it is not to evaluate whole process of transformation, but to track the fulfillment of one of the transformation goals. Wilson, Roscigno and Huffman study [24] also shows how problematic could be the transformation process without determination of milestones. Inflexibility of public sector could be the main barrier of new system implementation [9]. The case study of Czech Armed Forces transformation shows the dynamic change, which is consistent with one of its goals.

In the case study, we have to accept facts that the activities of the armed forces are derived from strategic objectives and existing security situations [7]. The number of military personnel is kept on the level, which is based on the long-term plans and strategic documents prepared by the Ministry of Defense. These documents are *The Security Strategy of the Czech Republic* [18], *The White Paper on Defence* [11], *Long-term Perspective for Defence 2030* [12], *The Concept of the Czech Armed Forces 2025* [13], or *The Defence Strategy of the Czech Republic* [16]. Based on these documents, it is possible to regard the number of military personnel as exogenously given to a certain extent. This fact also determines the minimum financial requirements for the saturation of personal costs. Unlike the permanent military profession, the supportive bureaucratic apparatus shows bigger dynamics, and it is possible to judge its

efficiency on the grounds of its utilization and performance. In the context of the detected results, it is possible to agree with the study of Rosse Babbage [1]. He considers the transformation of armed forces not only a strategic issue, but mainly an economic one.

The detected values indicate potential savings, which result from the higher utilization of the supportive bureaucratic apparatus. The savings in this sector should be seen as rather relative, because we deal with a non-productive part of economy, where, unlike in the private sector, reducing the size of the supportive bureaucratic apparatus does not necessarily mean absolute savings [2]. To save costs, the speed of process change is also important, which is more rigid in the public sector than in the private sector [10]. Precisely rigidity and relatively low operability are the reasons why it is not possible to reach such high savings through the change of the system in the public sector as in the private sector [3]. Another important aspect of the transformation is also the willingness to accept the change, which is motivated by profit in the private sector but only by responsibility for public funds in the public sector [20].

5 Conclusion

The detected values in the utilization of the supportive bureaucratic system tell us, on the one hand, nothing about the specific structure of the Ministry. On the other hand, they illustrate the dynamics of change which occurred due to the structural transformation and which was reflected in the established trend of the next decade. On the basis of one criterial assessment, we can regard the transformation from the army with compulsory military service to a professional army as successful, even despite the relatively long period in which the utilization gradually increased. The pre-transformation goal state the rate between professional soldiers and civilian employee higher than 3.4, but the rate ten years after transformation was just little bit over 3. In the context of personal structure optimization, we focused on the one criterial evaluation which was based on the tracking the dynamics of fulfillment one of the pre-transformation goals. We can abstract from the results the conclusion that the higher utilization of the supportive bureaucratic apparatus can be seen as relative savings of costs. The efficiency rate of a specific segment of the public sector cannot be determined solely based on the utilization indicator of the apparatus. The indicative value of the indicator is limited by its very narrow focus. On the other hand, in the areas of the so-called minimal state, its application may be one of the few options for monitoring changes in the functioning of a given public sector segment. If we admit the limits and consider the indicator complementary or approximate, it can be successfully applied.

In the case of the transformation of the Czech Army from the army with compulsory military service to the fully professional army, it is possible to demonstrate how the optimization of personnel structure has changed over time. The pre-transformation goal was not fully achieved, but the trend seems to be positive and could be achieved in future. The relevance of alternative indicators is in general in the possibilities to tracks the dynamics of change over time. The indicator shows us that at the beginning distortions caused by the transformation were evident in the lower utilization of civil employees. In the following years, the utilization rate increased until 2009, when the same level of utilization as before transformation was reached. In the following years, we can see a further increase in the utilization rate up to the highest measured value in 2017. If we assess the army transformation solely based on the utilization criterion, it is possible in the long run to regard the structural change in the context of personnel optimization as successful and the alternative indicator as proper tool for tracking and evaluating goal fulfillment.

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Consistency of Czech Foreign Policy and Export Tendencies towards States with Ongoing Conflict – Case Study Comparison

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Abstract

In democratic countries, the relationships between the procedures in both foreign policy and economic exchange should resonate with each other. The opportunity to analyze this hypothesis is used in the case of the Czech Republic's export to two countries. Although both of them find themselves in an armed conflict, the premise of the Czech Republic's political approach towards each of them is extremely different. Ukraine is considered the state, which is supported by both the Czech Republic and the European Union, whereas the Al-Assad regime in Syria is often politically condemned and political sanctions are imposed on it. The analysis of the data carried out by The Czech Statistical Office on the statistical value of export confirms the following essential premise: the worsened political relationships have a strong impact on the reduction of exports. This trend is less visible in the case of Ukraine, which is politically supported. In the case of both countries, the factor expressing the development of the internal situation is visible. In the case of Syria, a certain minimum value of cooperative willingness has been identified which is not affected by political proclamations, but rather by an actual possibility to physically export.

1   Introduction

Exporting is one of the indicators, which describe the relationships of individual countries not in terms of economy, but also in terms of politics. These two categories are closely intertwined and, as a rule, corresponding correlation can be identified between them. In other words, their consensus at the political level should express their mutual economic relations. This rule should work in the opposite way, too. This hypothesis, of course, is not always entirely accomplished. Nevertheless, the cases where there is a clear disregard for both political and economic behavior between the two states are, as a matter of logic, virtually absent in practice. What we can already see in reality is the situation, when one compares the rhetorical or other external manifestations of one of the categories mentioned, which does not correspond to the manifestations of the other. In particular, it is a situation where, at the political-declaratory level, state representatives express themselves critically or skeptically, but at the economic level, there is a good cooperation. Similarly, there may be situations where, despite significant rhetorical and declaratory attitudes at the political level, there is no proportional and adequate cooperation at the economic level. [2]

For the purpose of the academic analysis, the issue of this potential discrepancy is particularly interesting from the perspective of democratic countries, where society is supposed to shape its economy and politics through elected elites. The role of political elites that shape both foreign policy and economic exchange should logically be in accordance. At the same time, society, in whose interest the elites act, should be credibly informed about the situation of foreign policy and economic exchange. [20] The cases where there are inconsistent manifestations between economic behavior and political rhetoric are very important for a democratic society, because these cases reveal the suspicion that the elites may in some way influence or modify the notion of reality.

1.1 Hypothesis and goal

In history of international relations, we can observe strong link between politics and economy. Relationship in between those two segments is mutual, and in some cases, the politics dominantly influences economics and in some cases vice versa. In this paper, we aim to describe cases, when politics had dominant effect on economical behaviour of participants on international trade. Good example of this practice may be adaptation of Truman´s doctrine of deterring communism, which was later fallowed by economical initiative of Marshall´s plan.

Hypothesis: The political speech acts are produced by relevant representative institutions, it is fair to assume, that their impact will meet its goals on levels of practical economy. This model would refer to coherent political-economical complex, that would act interdependently – in this case export agents would take in concern recommendations of political actors, to avoid or to support certain trade partners.

The main goal of this paper is deeper analysis of export flows determinants by political statements. Paper is to be understood as an exploration of lower levels of possible knowledge. Other goal is to try to find new interesting evidence enabling a deeper understanding of relationship between political rhetoric and trade consequences.

2 Material and Methods

For selecting the criterion, by which the states of cross-border trade will be analyzed, the method of Extreme Case Sampling has been used. The qualitative approach that is applied in this method compares two case reports that have inherently different characteristics. In principle, they can best show the course of changes caused by transformations in the environment. According to Patton [19] an approach involving Extreme Case Sampling will be used that works with unusual phenomena or with the sampling of politically significant cases. [11] In particular, the choice was narrowed to two cases, which essentially differ from each other. Therefore, they can express or deny the manifestation of the influence the Czech Republic's behavior. As the two extreme cases, the following two countries were selected: Ukraine and the Syrian Arab Republic. Selecting these two reference objects is not random. Historically, they are long-term business partners of the Czech Republic, or more precisely, they were long-term business partners of former Czechoslovakia. At the same time, they are the states that have been affected by the armed conflict in about a similar period and quite unexpectedly. These facts will serve to make the comparison more accurate.

2.1 Export Criterion

As an indicator of the economic activity of the Czech party, export was logically used, since it probably best measures the willingness of the Czech party to trade with another country. Obviously, exports are the most appropriate instrument after statistical processing for the following reason: Compared to imports or trade balances, exports reflect the intentionality and real interest of the Czech party to enter into the business relationship with the given country, despite possible controversies. An optimal tool for this study is data collected by the Czech Statistical Office, which collects information on foreign trade and provides information on its statistical value.

2.2 Time Delimitation

Both armed conflicts take place at about the same time. The Syrian conflict started two years earlier, in connection with the expansion of the so-called Arab Spring. A similar situation took place in Ukraine, when in 2013 the so-called Euromaidan protests triggered both the suspension of the government of Viktor Yanukovych and the subsequent annexation of the Crimea by the Russian Federation, as well as the armed conflict on Donbass. For the purpose of this paper, the statistical data from the conflict period will be identically used in both cases. At the same time, an indication of the situation of the year preceding the conflict will be appended,

so that the trend is at least outlined and a potential change is recognizable. In the case of the Syrian conflict, we will deal with the period between 2010 and 2018. In the case of the Ukrainian conflict, we will focus on the period between 2012 and 2018 (for needs of comparison with Syrian case, there will be also years 2010 and 2011 visible in graph). As a comparison, there is also a graph of Czech exports in total. This helps the reader to better understand the trends and timeline.

2.3 Theory of Securitization

The relationship between political and economic sphere is well manifested in this case, where we aim to identify the influence between political acts and economical behaviour. Roots of this approach are based in international relations field theory of securitization. Securitization (in international relations studies) was presented as a tool how to interpret new security phenomena after dissolution of bipolar world structure. Securitization, founded in environment of Copenhagen school, consists from identification of potential existing problem – politicization – „speech act"– and securitization itself (than possible de- securitization). [4]The speech act is considered as fundamental aspect of this process, since it has the most effective impact on actors of this process. Theory of securitization operates with four categories of possible actors.

- A securitizing actor/agent: an entity that makes the securitizing move/statement;
- An existential threat: an object (or ideal) that has been identified as potentially harmful;
- A referent object: an object (or ideal) that is being threatened and needs to be protected;
- An audience: the target of the securitization act that needs to be persuaded and accept the issue as a security threat. [3]

In our case the roles of actors are in point of fact clear. A securitizing actor/agent in our case is Ministry of foreign affairs, who represents and heralds the official statements outside Czech environment. The Ministry of Foreign Affairs is the central body of the Czech Republic's state administration for foreign policy, in which it creates a concept and coordinates foreign development assistance and coordinates external economic relations. [17] When it comes to identify an existential threat, there is more relevant choices than meets the eye-the state is motivated by change of the international environment- specifically by the fact that former trade associate country is in state of war. The threat in this case is not to get involved to supporting of regimes gone rouge, because it may cause negative reactions of much more important partners. A referent object, in which name are these steps being taken is of course starving population, casualties of war, and principle of "justice". The audience consist mainly from Czech businesses, who are urged to obey states opinion. Partially, other states and international partners can be also considered as audience of process of securitization, to make a good impression.

3 Results

This contradiction is best illustrated by relations with the countries that are viewed internationally as controversial or problematic. In the context of the Czech Republic, it is necessary to proceed from the fact that this country is a member of various international organizations. From a political perspective, these are mainly NATO and the EU. It is obvious that membership in these organizations clearly does not mean that the views of all member states on foreign policy and the economy are identical. However, it can be anticipated that, at least in the fundamental issues based on the resolutions and directives adopted, the member states agree with one another. For these member states, the so-called rogue states most often play the role of the biggest enemy, which, in general, has been causing problems for the international community over the long-term by its non-adaptability, aggressive politics or non-compliance with the standards of international coexistence. [12] Other categories are states from competing groupings. From a political point of view, they are mainly states and federations whose history is

defined by the Cold War and its outcomes. The representatives of this category are generally understood as states such as the Russian Federation or the People's Republic of China, as well as some factions and cartels such as OPEC and the like. The last category of the states with which economic exchange is burdened by political circumstances, are the states that share a relatively unfortunate characteristic—the existence of an armed conflict on its territory. The states that have been pushed into violent internal disturbances or into armed conflicts with their neighbors are generally perceived as not fitting for regular political or economic cooperation, especially because their governments are weak or endangered. Therefore, it is not clear whether these governments really represent the interests of the population and whether they are capable of meeting their commitments. It is precisely the above-mentioned armed conflict countries that are perceived as risky. At the political level, they are often criticized and treated with great caution, considering the fact that there are extensive violence and the threat to human rights. At the same time, however, there may be a paradox where these countries or regimes are willing to conclude very lucrative business contracts and partnerships, because their motivation is survival alone and not mutually beneficial transactions. Newly set establishments and government garnitures can find themselves in a similar situation. Although not yet internationally recognized, they nevertheless de facto control certain territories which need certain strategic commodities that the new establishments are willing to get even under unfavorable conditions. At the same time, conflicts and, in particular, the following periods, offer the reconfiguration of old and long-term economic structures and allow entry to new players. In some cases, these conflicts even allow complete redefinitions of new partners. [13]

3.1 Definitions of Both Countries - Ukraine

The very beginning of the conflict in Ukraine is related to many problems. The divergent tendencies of President Viktor Yanukovych's garniture towards an association agreement with the EU are usually mentioned as "the last straw that broke the camel's neck." The subsequent overthrow of the government and the accession of the new pro-European one were welcomed by the EU states. The EU, like the Czech Republic, perceives Ukraine as a country that seeks to extricate itself from the external policy of the Russian Federation and sees it as a victim of a violation of international law. At the same time, the EU identifies Ukraine as a victim of aggression, whether in the case of the annexation of the Crimea, or in the case of the conflict with Russia which is backed by the self-proclaimed republics. The Czech Republic with its declaration published already in 2014 [15]

"Given its historical experience of the 1930s, the Czech Republic, besides other things, is particularly sensitive to the current Russian conduct. It will never agree with undermining the territorial integrity of Ukraine, or with the annexation of the Crimea." [15]

Thus, the Czech Republic has joined other Western and EU states that have strongly condemned the Russian Federation's move and backed up Ukraine. Ukraine has been politically endorsed throughout the conflict by Western countries, the EU and the Czech Republic, despite the statements of some pro-Russian politicians. Thus, Ukraine can be considered a country in an armed conflict which is supported by the policy of international organizations of which the Czech Republic is a member, as well as by the Czech Republic itself.

3.2 Definitions of Both Countries – Syria

The relations between the Czech Republic and Syria have been greatly affected by the ongoing conflict. The Czech Republic has shared the approach of the international organizations whose member it is, and criticized the situation in Syria, as well as the Assad regime. Despite the fact that the Czech Republic, as one of the few countries, still maintained diplomatic relations in the form of an embassy, it proceeded mainly from administrative and bureaucratic causes by providing services to friendly countries such as the US or other EU countries [9] It was the EU as a whole which joined the sanctions that were directed against the regime structures that supported the Assad regime. Even the representatives of the Czech Republic, such as Foreign Minister Lubomír Zaorálek, expressed a rather strict view [16] towards President Assad:

"President Assad cannot represent the future of Syria. However, in order to stop the violence, it will be necessary for all Syrian representatives except for extremists to sit behind the negotiating table." [14]

Widespread criticism from Western politicians affected Bashar al-Assad and his establishment, especially after alleged chemical attacks. [7] The Czech Republic, the EU [5] and others take a very cautious stand on the political future of the Syrian Arab Republic, mainly because of their unwillingness to accept the continuation of the government of the Assad regime. This regime is suspected of war crimes and crimes against the civilian population. On the other hand, both the Czech Republic and the EU cautiously approach the movement of the "rebels" whom the hopes were initially pinned on. Nevertheless, it turned out that the "rebels" were unable to defeat the regime, constructively negotiate about the future and remain inadequately un-radicalized.

Syria is therefore considered to be the second extreme, a country that is at war, but its representatives lack the political support of the Czech Republic as well as of other international groupings of which the Czech Republic is a member. On the contrary, the Syrian regime is ostracized, sanctioned, and at some stages of the conflict even considered a political opponent.

3.3 Comparison

Export statistics for Ukraine indicate an interesting trend. To a large extent, they are copying the development of the armed conflict, with 2014 and 2015 being the most intense in terms of armed clashes and conflict dynamics. [8] With a certain degree of approximation, the graph can be interpreted in a way that political and economic relations tend to be similar. It is understandable that in the most difficult times of the conflict the interest in economic exchange declined, but in 2016 it was growing again and the trend was showing positive growth. This makes it possible to conclude that the Czech Republic is interested in cooperating with Ukraine in foreign trade. Despite the fact that the conflict in Ukraine has not ended, export values are slowly approaching pre-war years, which may indicate that Czech exporters have managed to restore old contacts or that new business partners from the Czech environment have been able to adapt to the specific situation in Ukraine. When focusing on the factors observed and excluding other potential influences, it can be argued that both the political and economic approach of the Czech Republic towards Ukraine is to a large extent congruent and follows a similar trend, even in the case of the conflict.

Graph 1: Exports to Ukraine 2010-2018

Source: Author – based on Czech Statistical Office [6].

In the case of exports to Syria, there is a significant decline correlating with the escalation of the armed conflict. The imposition of both sanctions and embargo [10] has hit exports harshly. It is also important to perceive the context of the conflict itself: the years in which the smallest export occurred were those that were of the utmost importance for the development of

the conflict. In 2015, there was the intervention of the Russian Federation in favor of the Assad regime that was considered by some to be too weak at the time. [1] Therefore, it is possible to assume that the stabilization of the Assad regime by a foreign party has stopped a steep fall in exports and de facto fixated the value of Czech exports at a certain minimum level. When analyzing this phenomenon, it is obvious that economic activity is, of course, copying political attitudes towards a country that is in "disfavor." However, there is a certain bottom which seems to adapt itself to the real-life, pragmatic situation of a conflict-stricken country rather than to political rhetoric or political circumstances. In the case of minimal stabilization, trading continues, albeit to a lesser extent.

Graph 2: Exports to Syria 2010-2018
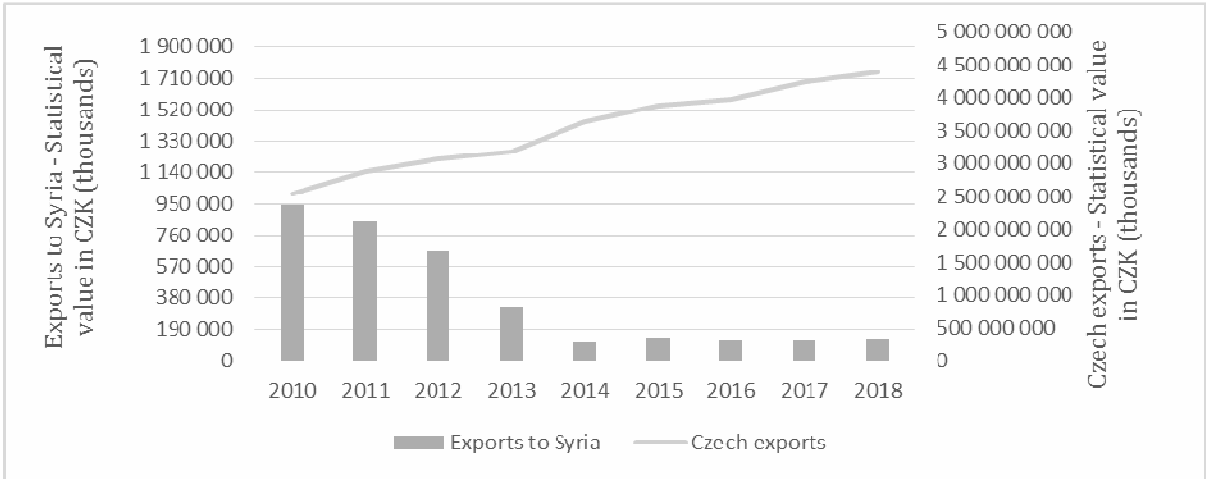
Source: Author – based on Czech Statistical Office [6].

4   Discussion

Policy is not to be considered as an only determinant of quality of exchange. This paper strives to focus only on part of complicated relationship between policies and economical behaviour, in this case on the aspect of possible influence of political recommendations towards economical agents. We keep in mind, that there exist bunch of other evident or latent factors, such as condition of economy, political transition, geography, distance, etc. In this case both compared cases were chosen in consideration of fact, that armed conflict is understood to be an extreme manifestation of political behaviour. Following this logic, we may achieve the best possible demonstration of possible relationship mentioned in hypothesis. However, we still keep in mind, that possible findings are only partial, and can be presented as supporting new evidence, and not as a some undisputable finding. Inspiration for this paper was also an example of study named The political determinants of international trade. This study was testing three arguments describing relationship between politics and trade flows. One of the hypotheses was weather: "The greater the degree of common interests between a pair of states, the greater will be their trade flows." [18] This aspect is relevant for our paper since we compare 2 countries, towards which the political attitude of Czech Republic differs significantly. Ukraine is being described as an ally, however Syrian regime is often titled in rather aloof matter. The other relevant hypothesis from mentioned study, relevant for this paper, is weather: In a multipolar system, trade between allies should not differ from trade between non-allies. Of course this study is based on experience of long lasting bipolar system, but still analyses similar matters as our paper. „Our evidence indicates that other factors are more important than alliances. Prime among these are joint democracy and the similarity of policy interests between the states. "The results offered in discussion of this study state: "We have found evidence about the effect of politics on international trade at the level of overall trade flows. We use a broader sample of data with greater variation and more appropriate methods for that data than do existing studies. Further support for these arguments must be found at lower levels of analysis than aggregate

trade flows." [18]This statement was understood as a motivational basis for our lower level analysis, with its specification on certain detail aspects of possible relationship, rather than on main trends and explanations.

5 Conclusion

Our data analysis was supposed to prove or disprove the following hypothesis: The mutual economic relations of the two states should also express their political congruence and vice versa. In this context, the following question must also be answered: To what extent is the fact that the country is finding itself in an armed conflict relevant in this respect? After performing the analysis, we can conclude: Having focused only on the factors observed (exports and time trends), and having overcome the potential additional effects, we can identify the trend in the cases of Ukraine and Syria which confirms that the political approach will greatly influence the willingness to export from the Czech Republic to a given country. Positive political mood indicates greater enthusiasm to continue business cooperation, while negative political atmosphere minimizes the interest in exporting to a minimum. Apart from this anticipated development, we have identified the following: In addition to external political mood, the real situation in the country and the conflict phase also significantly affect the willingness to export. In some cases, this factor may logically appear to be hardly influenced by external political relations. The study has found some general tendencies and opens up the possibility of exploring deeper issues that are needed for even clearer outcomes. The comparison of the two countries is based on the logical criteria of the conflict's similarity over time. Main goal – adding of new evidence in wider discussion about politics dependence towards trade flows – was successfully undertaken. The new evidence is to be understood as a piece of mosaic, that may offer a better understanding of this great issue. Of course this paper explains only minor part of complex problematics and should be followed by other academic research, for example by additive replications for other similar cases. Analysis of other aspects than export would also be very beneficial for further research, and would make this new evidence much more robust.

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Abstract

This paper deals with Baumol´s cost disease theory. This theory is usually used to explain the different dynamics of some sectors of the economy, particularly public sector and to explain the growing share of the public sector in total resources. The aim of the paper is to verify the validity of Baumol´s theory on data from the Czech economy using the time series from 1995 – 2017. It was found that the Czech economy shows some symptoms of Baumol´s cost disease. These include, in particular, the growing share of the tertiary sector in total gross value added and employment, declining trend in labor productivity in the tertiary sector, declining expenditure on goods and rising spending on services spent by households. It was also confirmed that wage growth in the tertiary sector is determined by wage growth in the secondary sector, which is in line with Baumol´s theory. Although the share of the public sector in total resources in the Czech Republic is increasing, the share of public expenditure in GDP has a decreasing trend. This may be due, inter alia, to the faster growth rate of GDP recently.

Keywords: Baumol´s cost disease; gross value added; productivity of labor; public expenditure; wage .

JEL Classification: E24; H50

1 Introduction

The government in the Czech Republic often addresses the issue of salary increases in the public sector (education, health, social services, culture…) These are the sectors affected by market failures which undoubtedly bring benefits to society but without the support of public budgets would not stand in the competitive sphere. The characteristic feature of these industries is the fact that their labor productivity stagnates over time. In this context, Baumol gives an example connected with live performance. "A half hour horn quintet calls for the expenditure of 2.5 man hours in its performance, and any attempt to increase productivity here is likely to be viewed with concern by critics and audience alike." [1] It is known, from the economy that the wage growth should correspond to the increase in labor productivity to avoid inflationary pressures. If labor productivity in the public sector stagnates, wages should stagnate, too. However, this would mean that such a teacher, nurse, theatrical actor or musician would be livelier and legitimately worried about the existence and future development of these sectors. What determines the growth of wages in the public sector is, according to Baumol´s theory, productivity in the productive sector. Wages in the public sector are, therefore infected by wage growth in the productive sector. This is why the disease is talked about. The unbalanced growth model attempts to explain growth of public expenditure relative to the gross domestic product and has the potential to explain the different dynamics of some sectors of the economy. Although this theory has existed for more than half a century, it retained its basic idea. The aim of the paper is to verify the validity of Baumol´s theory on data from the Czech economy. The article gives the answer to the question whether the Baumol´s cost disease affects the Czech Republic or does not.

2 Material and Methods

2.1 Material and methods

J. W. Baumol first published the Unbalanced Growth Model in Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis (1967). The model envisages the division of the economy into two sectors – a progressive sector that produces long-term growth and human work is seen as a means to achieve output and a non-progressive sector involving activities with stagnant or slightly growing productivity, with human work being usually the final output. Other prerequisites for the model are:

1. Production costs are limited to labor costs only.
2. Rate of wage growth is the same in both sectors due to labor mobility.
3. Growth rated of wages is derived from the rate of productivity growth in the progressive sector. These limitations can be written as follows:

$$Y_{1t} = aL_{1t} \qquad (1)$$

$$Y_{2t} = bL_{2t}e^{rt} \qquad (2)$$

$$W_t = We^{rt} \qquad (3)$$

In this paper, economy is divided into four sectors – primary sector (A-B), secondary sector (C-F), market tertiary sector (G-N) and non-market tertiary sector (O-R) according to NACE 2 classification. It is worked with time series in the paper. Data, from the period of 1995-2017, are drawn from the Czech Statistical Office and Ministry of Finance websites. Employment is measured by the number of working hours per sectors. Labor productivity is calculated as production of different sectors per working hour. For calculation of the share of public expenditure in GDP, annual data on general government expenditure by function were used. These data are in line with the international COFOG standard and the Eurostat national accounts data transfer programme. The paper is based on the use of applied economics, empirical and analytical methods are used. Linear trends and regression coefficients were used for orientation and support of the statements about the processes taking place in the Czech Republic.

2.2 Literature overview

Baumol´s model has been followed by a number of authors and endeavoured to enrich it somewhat. They have often come to conclusions similar to those of Baumol, namely that economic growth can lead to an increase in the share of the public sector in the total resources of the economy. J. Robinson responded to the fact that the cost of providing services in the model remains the same, while the cost of producing the secondary sector can be reduced due to higher productivity. [14] According to M. Keren, public sector deficit financing would only occur if the elasticity of municipal taxes were lower than the unitary rate. [8] D. Leslie extended the model to another sector. He does not divide the economy into labor productivity, but according to the nature of outputs, whether private production of goods, private production of services and public service production. Like Baumol, the growth rate of productivity is slower than that of commodity production, as well as a consistent wage growth rate. D. Leslie also takes into account changes in real consumer incomes, so the growth of wages in public production is not considered to be clearly risky. If the cost of public service provision increases more quickly than real household income, then governments can cover this deficit with rising tax revenues, as it can be assumed that the rise in personnel costs stimulates growing productivity, for example, the commercial production of goods. The main problem of public services stems from the impossibility of reflecting the real demand of consumers. For generating public sector, therefore, in the end, the maximum amount of money that the mechanism of the economies can afford may be provided in principle to provide long-term stability. [9]

Similarly, N. Oulton develops the model of brokerage (commercial and financial). It deals with the nature of the output of the service sector, which it attaches to crucial importance and divides the services into those whose output is the final product and the intermediary services. Based on this breakdown, it draws on three models in which it analyses the impact on productivity growth rates. [11] M. C. Harvey criticizes the model for being supply-oriented. According him the analysis must incorporate both supply and demand aspects in order to explain the mechanisms that determine production and employment in the different economic sectors really. [7] B. Chapman draws attention to the mathematical and logical errors of the original model. Independent errors are found in the derivation of Baumol´s propositions and in the analysis of static externalities. [3]

J. W. Baumol himself has also revised the model several times. In 2012, he applied his theory and its implications, for all practical purposes, to health care. With his theory explained the exploding cost of health care in the US. The good news, according to Baumol, is that progressive sectors churn enough purchasing power for people to be able to afford rising health care bills, the bad news is that he sees these other sectors, with sizable productivity gains and lower costs, as also making weaponry and environmental "bads" increasingly affordable, and thus posing significant threats to human welfare. [2] Equally, J. Hartwig explained increasing trend in the share of health care expenditure in GDP in all OECD countries. [6]

3   Results and Discussion

The most important symptoms of Baumol´s cost disease are:
- deindustrialization and growth of public sector,
- movement of the labor factor from the secondary sector to the tertiary one,
- productivity of labor in the public sector does not grow,
- public sector wage growth is determined by the wage growth of the secondary sector,
- expenditure on goods in relation to GDP decreases while expenditure on services, such as health or education, in relation to GDP, increases,
- growth of public sector expenditure in relation to GDP.

Deindustrialization is a natural consequence of the process of economic development in a highly developed economy and it affects economic growth, employment and industrial relations. Prusvic in his article mentions the analysis of A. S. Anderson, who dealt with the influence of globalization on deindustrialization of OECD countries. His analysis has combined deindustrialization with the foreign direct investment flow. It leads to the displacement of labor from industrial production and the shift of investment from industrial production to services. [13] Also, the Czech economy has undergone a gradual decline in the share of the secondary sector in total output of the economy in favour of services. Due to the transformation of the Czech economy in the 1990s, we recorded a decline in output in GDP also in the primary sector. This is evident from the development of the share of gross value added of different sectors in total gross value added in Figure 1. This share declined from 6.6 % in 1995 to 3.0 % in 2017 in the primary sector, in the secondary sector it declined from 39.8 % to 36.3 % but it increased from 39.6 % to 43.5 % in the market tertiary sector as well as in the non-market tertiary sector, where this share increased from 15.5 % to 16 %.

$y = 0.144x - 246.34$
$R^2 = 0.465$

$y = -0.0611x + 159$
$R^2 = 0.1196$

$y = 0.0183x - 20.788$
$R^2 = 0.0561$

$y = -0.1261x + 257$
$R^2 = 0.7271$

Primary sector
Secondary sector
Tertiary market
Tertiary non-market

Gross value added to total gross value added, in %

Year
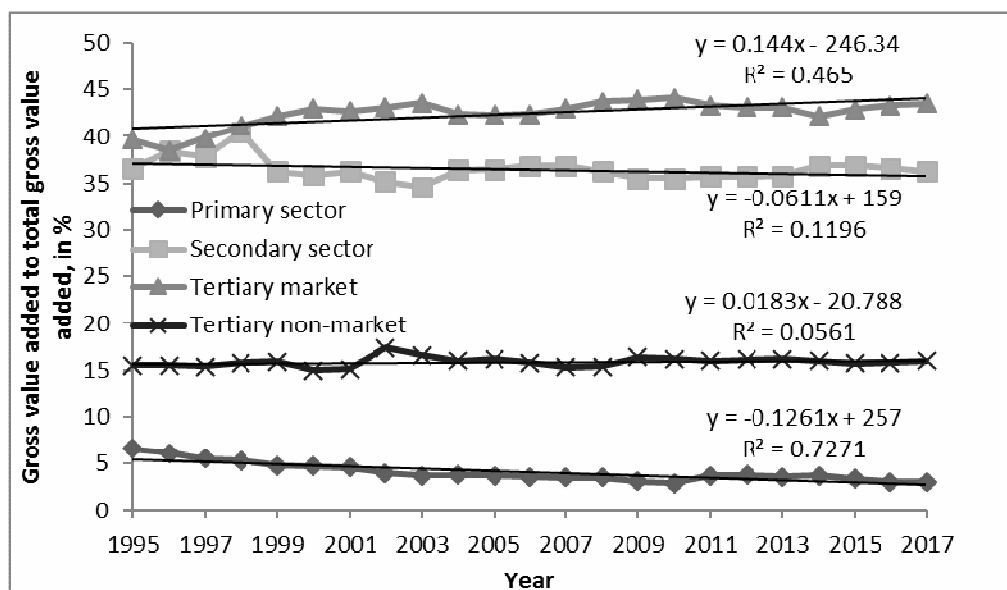
Source: [5], author.

The deindustrialization process is linked to the movement of the labor factor from the secondary to the tertiary sector. In the transforming economy, this process helps reduce structural unemployment resulting from sectoral changes in the national economy. The Figure 2 shows the development of the share of employment in the different sectors of the economy in total employment. Until 2004, employment was the highest in the secondary sector, since 2004 employment is the highest in the market tertiary. In the reference period, the share of working hours in the primary sector decreased from 7.1 % to 3.9 %, in the secondary sector it decreased from the 38.6 % to 36.6 %. On the contrary, this share increased in the market tertiary sector from 35.2 % to 40.4 % and in the non-market tertiary sector from 17.5 % to 19.4 %.

Figure 2: Employment
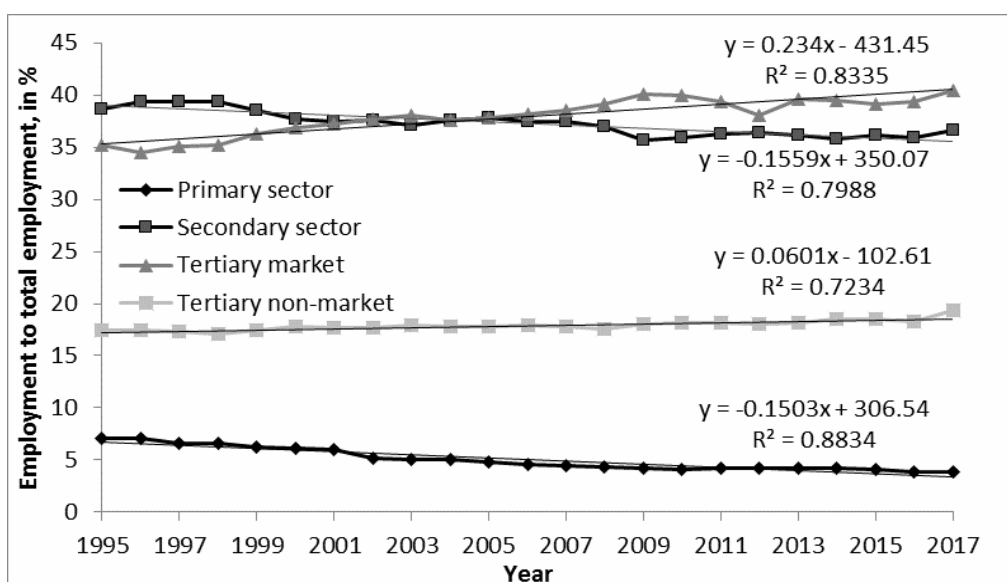
$y = 0.234x - 431.45$
$R^2 = 0.8335$

$y = -0.1559x + 350.07$
$R^2 = 0.7988$

$y = 0.0601x - 102.61$
$R^2 = 0.7234$

$y = -0.1503x + 306.54$
$R^2 = 0.8834$

Primary sector
Secondary sector
Tertiary market
Tertiary non-market

Employment to total employment, in %

Year

Source: [5], author.

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The share of labor productivity of different sectors in total productivity is shown in Figure 3. The highest share is occupied by the secondary sector, with labor productivity having a growing trend here. In other sectors, this share is even declining. The lowest productivity is shown by the non-market tertiary sector. The average rate of growth in labor productivity is 6.3 % in the secondary sector, 5.6 % in the market tertiary sector, 5.2 % in the primary sector and the lowest, 3.7 %, is in the non-market tertiary sector.

Figure 3: Productivity of labor
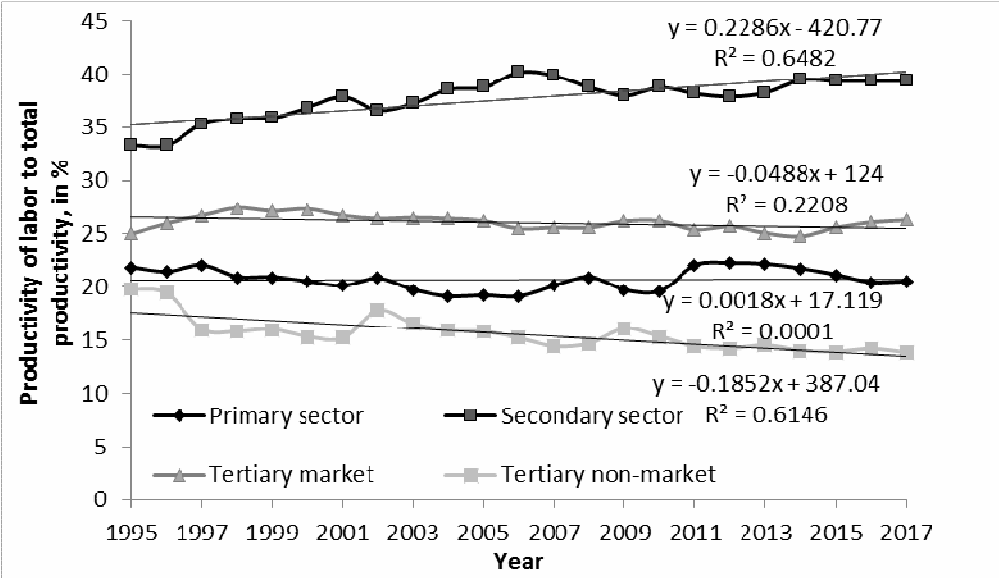
Source: [5], author.

The tertiary sector or service sector is labor-intensive and its feature is the dominance of personnel costs in the cost portfolio. [12] Assuming the same salary and wage trends in the economy as a whole, which corresponds with the growth of the labor productivity in the secondary sector, there must be an increase in labor costs in those sectors that do not achieve such productivity growth with the overwhelming majority of them in the tertiary sector. According to J. W. Baumol, this will lead to the relative cost per unit of output in the non-progressive activity sector being raised without limits, while in the technologically progressive sector it will be constant. The Figure 4 shows the evolution of average gross monthly wages in the different sectors of the economy. The growth rate of wages is the same in all sectors, averaging 6 %.

Figure 4: Average gross monthly wage

$$y = 1002x - 2E+06$$
$$R^2 = 0.9714$$

$$y = 1037.5x - 2E+06$$
$$R^2 = 0.9807$$

$$y = 929.57x - 2E+06$$
$$R^2 = 0.9823$$

$$y = 951.9x - 2E+06$$
$$R^2 = 0.9794$$
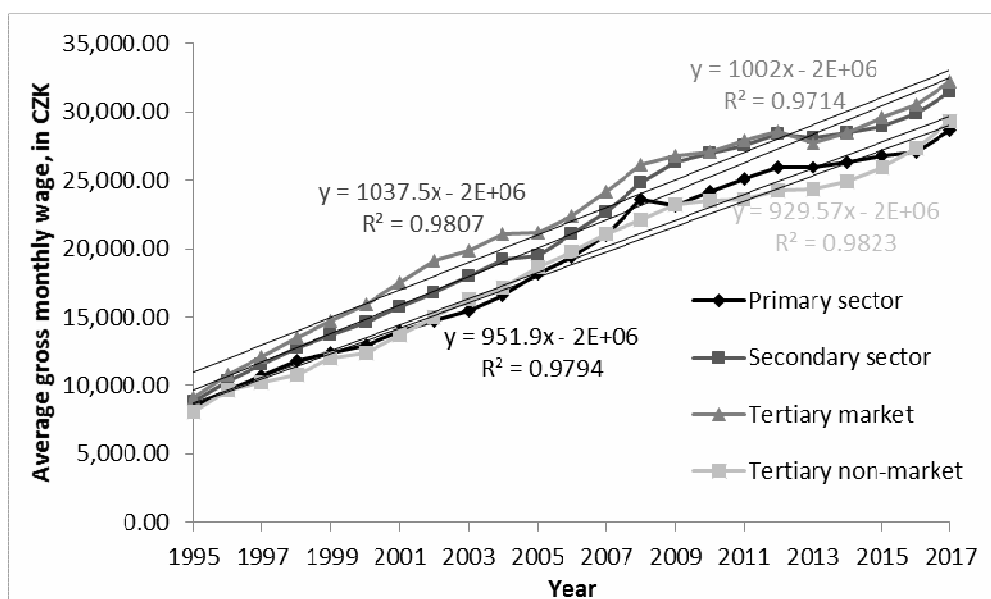
Source: [5], author.

Given that the tertiary sector cannot increase its productivity, but its wages are rising due to rising wages in the secondary sector, the service sphere is becoming more and more expensive. Services that are deemed necessary become the most expensive; there is no decrease in demand for them. J. W. Baumol sees the cause of that industrial goods fall into a category of inferior goods in the developed economy. [1]

In Figure 5 we can see that the share of expenditure on goods in GDP was above the share of expenditure on services in GDP, until 2001. While the share of expenditure on goods has a decreasing trend, (it decreases from 24.2 % in 1995 to 20.6 % in 2017) and the share of service expenditure is growing (from 20.6 % in 1995 to 22.6 % in 2017).

Figure 5: Expenditure on goods and services to GDP

$$y = 0.051x - 79.813$$
$$R^2 = 0.2202$$

$$y = -0.1762x + 375.15$$
$$R^2 = 0.59$$
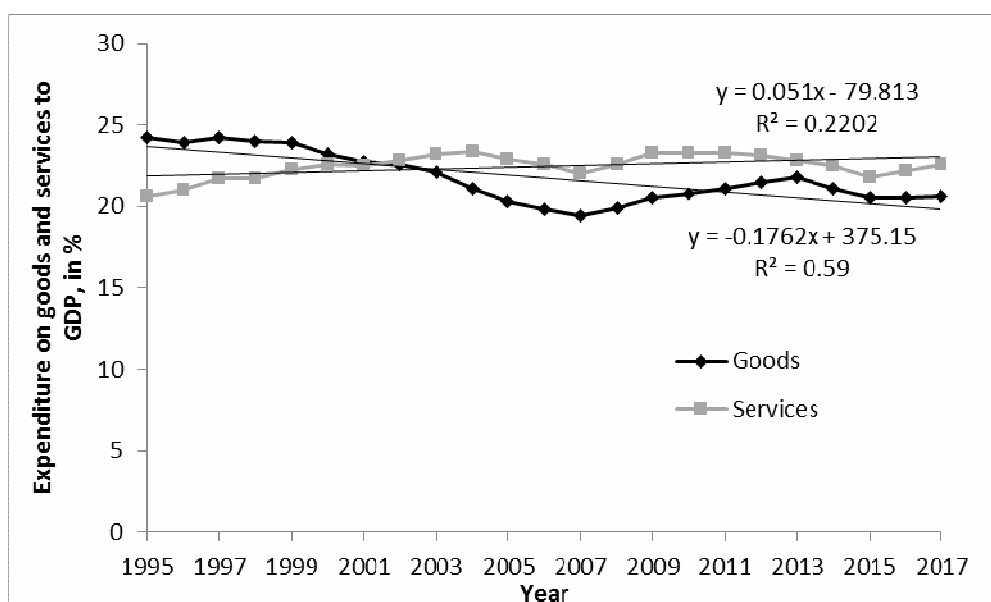
Source: [5], author.

The growing share of public expenditure in GDP in terms of the Czech economy has not been established. This share averaged around 43 % in the period under review. Even though public expenditure continues to grow, their share of GDP is declining as can be seen from the Figure 6. This is due to strong GDP growth and the boom in the Czech economy.

Figure 6: Public expenditure to GDP
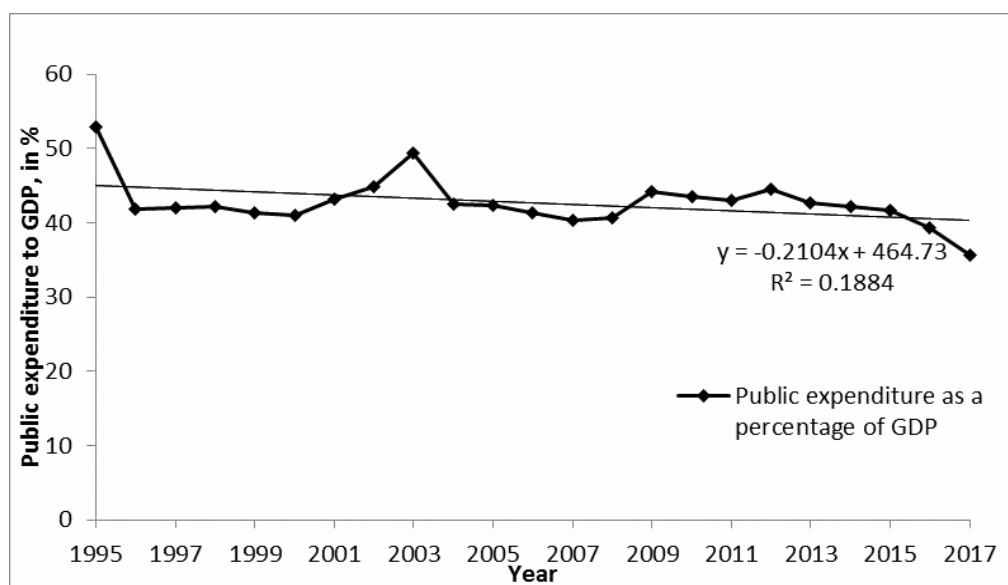
Source: [5], [10], author.

Conclusion

The aim of the paper was to verify Baumol´s theory on the Czech data and it was found that the Czech economy shows some symptoms of Baumol´s cost disease. Deindustrialization, as measured by the share of gross value added of different sectors in total gross value added, was reflected in a decline in the primary and secondary sectors and the growth of the tertiary sector, particularly the market sector. Employment has also evolved in the same way. The share of labor productivity of different sectors in total productivity was growing only in the secondary sector, again in line with Baumol´s theory. In the tertiary sector, this share should stagnate, but we can see even decreasing trend. The largest decline in productivity of labor was recorded by the non-market tertiary sector, which means the public sector. It should be noted that productivity of labor in it declines despite receiving subsidies from the state budget. This means that if they did not get these subsidies, the fall in productivity of labor would be even greater.

According to Baumol´s theory, wage growth is determined by the sector with the highest growth rate of productivity of labor, and that is the secondary sector. Czech data shows that the growth rate of wages in all sectors is the same. In the Czech Republic, it has also been noted that household expenditure on goods in relation to GDP is decreasing while expenditure on services in relation to GDP is increasing, despite the fact that services are becoming more and more expensive. This finding is in line with Baumol´s theory, too. Baumol´s theory is most commonly used to explain the growth in the share of public expenditure on GDP. However, this share has decreasing trend in the Czech Republic. Although the sum of public budget expenditure increases, its share on GDP is decreasing. This is due to the faster growth rate of GDP in the Czech Republic recently. To the same conclusion came Prušvic [13] who introduced a declining dynamics of labor productivity in the model of the private service sector. This caused a decline in the public sector´s share of GDP.

In conclusion, the Czech data confirmed the growing share of the public sector in total resources (measured by the share of gross value added) but did not confirm the growing share of public spending on GDP.

In my further research, I will focus on the symptoms of Baumol´s cost disease in the Visegrad countries or in all countries of the European Union and make some comparison. By regression, I will verify another Baumol´s finding that economic growth leads to an increase in the share of public sector in total resources, particularly to the growth of public expenditure on health and education.

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A Question of State Aid for Sectoral Development in the EU

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Abstract

The article presents the conditions of admissibility of State aid in the European Union, taking into account the rules applicable to the sectoral aid for enterprises. Pursuant to Article 107 par. 3 (c) of the Treaty on the Functioning of the European Union (TFEU), State aid may be compatible with the internal market in so far as it is intended to facilitate the development of certain economic activities. Thus, aid that is determined according to sectoral criteria may be permissible where this leads to the development of that sector. While many aid schemes are sectoral in nature, the European Commission has not sought to develop a sectoral approach in the development of its State aid policy. In general, the main state aid policy instruments governing horizontal aid, such as the guidelines on regional State aid or the guidelines on environmental protection, draw no distinction between different sectors, other than to restrict their application in certain circumstances. Nevertheless, certain sectors have been subjected to different treatment under the State aid rules. In particular, sectors that suffered from over-capacity, such as motor vehicles, synthetic fibres and textiles were subject to individual treatment by the Commission. The article offers an analysis of State aid granted by EU Member States is carried out under the provisions of the Treaty on the functioning of the European Union and the rules of State aid admissibility on the basis of the implementing sectoral regulations. The analysis made it possible to verify the influence of State aid on economic growth in EU Member States, which provided State aid for sectoral development in the years 2000-2017. The analysis was based on a linear regression model. The response variable (dependent variable Y) is the size of the GDP, while the explanatory variable (independent variable X) is the expenditure on State aid for sectoral development.

Keywords: economic growth; enterprises; the European Union; sectoral development; State aid

JEL Classification: *E62, K20, K33*

1   Introduction

The subject of competition policy usually involves private restrictions of competition – i.e. concerning possible restrictions of competition by companies – such as through the abuse of market power, through cartels and collusive behavior, and through horizontal and vertical mergers. A specific characteristic feature of European competition policy is the so-called State aid control based on Article 107 of the Treaty on the Functioning of the European Union (TFEU). It relates to possible distortions of competition through State subsidies to private or public companies that are in active or potential competition with other companies. Article 107 par. 1 of the TFEU issues a general ban on State aid. There are, however, exceptions to the rule defined in Article 107 par. 3 of the TFEU, which allow aid under certain conditions. These categories of exceptions exist in so-called regional, horizontal and sectoral aid.

The purpose of this article is to analyse the State aid provided by EU Member States to finance sectoral development, specifically the aid's impact on economic growth of these countries. Economic growth is measured by the size of gross domestic product in real terms (GDP), a synthetic measure of the state's economic well-being. For this article, the years 2000-2017 were adopted as the test period, i.e. the period during which the two most important development strategies - the Lisbon Strategy and the "Europe 2020" Strategy - of the European Union were implemented (taking the year 2017 as the closing period of observation was due to the available annual data on State aid, which is published by Eurostat.). It was posited that the amount of sectoral State aid provided by the EU Member States should be positively correlated with the size of the economic growth of these countries. If GDP is positively correlated with the

size of State aid for sectoral development, then positive economic growth among Member States occurs as State aid is increased.

1.1 Literature Review – Sectoral Aid

From the economic point of view relating to State interventionism it ought to be noted that State aid can be a justified action mainly because of the social prosperity if free competition market mechanism does not bring satisfactory results [2, 4, 10]. In this case, a well-planned State intervention may improve the allocation of production factors, reduce the irregularity in the market functioning and enable the achievement of common interest [7, 15]. The major criterion for providing State aid should be rationality, which is the highest determinant of the admissibility of using the aid measures [3, 11]. It results from the fact that in a market economy the competition is essential for the proper functioning of the market and protecting the interests of its participants [12, 13]. State aid should not violate it unless its violation will be compensated by positive market phenomena that were caused by providing the aid. With the use of the aid instrument the State realizes the objectives that are considered a priority for socioeconomic development [18].

Pursuant to Article 107 par. 3 (c) TFEU, aid in support of the development of certain economic activities can be deemed compatible with the internal market, provided they do not adversely affect trading conditions to an extent contrary to the common interest [17]. The importance of sectoral aid is on the decline, after the 1980s and 1990s saw a notable increase in sectoral aid in both the production and service industries as a result of the economic developments – as well as the particular political circumstances in Germany – during that period [1]. The development of the individual sectors in this respect still varies, however, significantly between the Member States. The European Commission has basically looked with disfavor on sectoral aid for a long time now [9]. It generally presumes that sectoral aid will distort competition more seriously than horizontal aid. Sectoral aid constitutes an exception to the principle of inter-sector neutrality. Of course, sectoral aid may also serve on occasion to compensate for undesirable sectoral effects of horizontal aids.

The European Commission had published as early as 1978 general principles for sectoral aid together with criteria to be applied in connection with the review of planned aid [8]. The principles included:

Firstly, for sector-specific aids, a principle of necessity applies. It is a precondition of every State aid that conditions in the affected industry make intervention absolutely imperative.

Secondly, the objective of sector-specific aid aimed at supporting economic sectors with structural problems must be the long-term structural restoration of viability to the affected sector. The undertakings and branches of production that benefit from State aid are thus to be put in a position that it is reasonable to assume they will in the future be capable of maintaining , in the face of genuine competition, without State aid. This must be demonstrated in prognoses. Sector-specific aids aimed solely at preserving the status quo or postponing decisions or adjustments which are inescapable from an economic standpoint are thus impermissible. Sector-specific aids must seek to ease the required adjustment to changed market conditions, for example through reductions in capacity and the restoration of competitiveness. Sectoral aid may, no more than any other kind of aid, serve as a mere pretense for operational aid.

Thirdly, sectoral aid is generally permitted only in degressive form and for a limited period of time. It must be connected with the restructuring of a whole branch of industry – unless granted only for a short period of time.

Fourthly, the aid intensity must be proportionate. It must limit the distortion of competition to a minimum. Only in this fashion are the distortions of competition associated with the State aid acceptable.

Fifthly, sectoral aid may not result in the simple shifting of industrial problems, for example from one Member State to another.

Sixthly, in connection with structural adjustments, funds may under certain circumstances be granted for the purpose of alleviating the short-term social costs of such adjustments. Closely

monitored operational aid may be conceivable as a crisis measure for narrowly limited periods of time.

Seventhly, sectoral aid obligated to pursue the goal of creating as much transparency as possible in the public financing of the industry affected and thereby to ensure, on a community-wide level, that competition in the sector is not distorted by one-sided measures.

This principles basically continue to apply. In the assessment of sectoral aid, moreover, the general principles developed for horizontal aid (aid pursuing trans-sectoral objectives) also apply [16].

In the case of sectoral rules, the European Commission has identified certain economic sectors such as coal mining, fishing, agriculture and various other branches of industry that are considered "sensitive" due to many years of economic problems and are therefore excluded from the general ban on State aid. The rules that apply to these sectors are altogether very heterogeneous [14].

For a group of so-called „sensitive" sectors, which were historically confronted with severe structural problems and thus were classified as „sensitive", some special considerations must be kept in mind. The following sectors are currently deemed „sensitive": iron and steel, synthetic fibers, motor vehicles and shipbuilding. The provision in the area of „sensitive" sectors are generally more restrictive than the provisions for other sectors. Investment aids that lead to an increase in production capacity are generally possible only to a very limited extent, or are even prohibited. Aid is often permissible only where it is connected with a decrease in capacity. In almost all sectors, there is an obligation to notify large individual aid grants individually.

Among the others sectors with special regulations is any industry the promotion of which is a policy concern of the European Union, and the granting of aid to which the Commission deems to have a special incentive effect. This is the case, for example, in growth industries and in the area of environmental protection.

An exceptional form of sector specific rules were the coordinated action to implement adequate support schemes and ad hoc measures to tackle the financial crisis and to assure stability in the banking sector and the broader financial system in 2008/2009. In order to safeguard financial stability, since September 2008, Member States have set up guarantee umbrellas, risk shields and recapitalization measures for the financial sector.

Moreover, there are sector-specific legal frameworks in the agricultural sector, the fisheries sector and the transport sector. In the agricultural sector, the provisions of State aid apply only to a limited extent, because the Treaty provides that State aid in this field is subject to the normal competition rules. In the transport sector, special provisions concerning State aid apply for air, rail, inland waterway and maritime transport, while the general rules apply to road transport.

There are also sectors subject to no special regulations, for which the Commission has however announced specific principles for the application of the competition provisions. In particular, the postal, public health and audio-visual sectors, and, until the financial crisis 2008, also the financial sector belongs in this category.

2 Material and Methods

From the perspective taken in this paper, adopted measure of economic growth is the size of gross domestic product in real terms (GDP), which is a synthetic measure of the economic situation in the State [19]. As a test period the years 2000-2017 were adopted, i.e. the period of implementation of the two most important development strategies of the European Union - the Lisbon strategy and the "Europe 2020" strategy; taking the year 2017 as the closing period of observation was due to the available annual data on State aid, which is published by Eurostat [5, 6]. The thesis was accepted that the amount of State aid for sectoral development provided by EU Member States should be positively correlated with the economic growth of these countries. The response variable (dependent variable Y) is the size of GDP in real terms, and the explanatory variable (independent variable X) is the expenditure on sectoral State aid. The

positive correlation of GDP with the size of sectoral aid would mean that with increasing State aid provided in this form there is positive economic growth of the Member States and their competitiveness increases.

Statistical analysis will be carried out based on two source tables.

The first shows the calculations for the linear regression model concerning the slope parameter (directional factor β). The factor b of the regression function II is the estimator of the parameter α β of regression function I. The standard error S_b is the standard error of the estimator b of the parameter β. The designations "Lower 95% " and "Upper 95%" concern lower and upper limits of so-called confidence interval of numerical values for parameter β, where this parameter is with a probability of 95%. t Stat is a test of the occurrence of a linear relationship between expenditures on State aid for sectoral development and the size of the GDP. This statistical test makes it possible to verify the authenticity of the null hypothesis that the parameter of regression function I type β is equal to zero, and the alternative hypothesis that it is not equal to zero (H_0: â = 0; H_A: â ≠ 0). The acceptance of the null hypothesis that parameter β = 0 would mean that the increase in the value of expenditure on sectoral State aid by € 1 does not cause any changes in the size of the GDP. This in turn means the lack of a relationship between expenditure on State aid for sectoral development and the size of the GDP. In other words, the acceptance of the null hypothesis means the lack of the influence of sectoral aid provided by the Member States of the European Union on the size of their GDP. Given the perspective taken in this paper, it will be essential to reject the null hypothesis in favor of the alternative - that is, there is a significant statistical relationship between expenditure on State aid and the size of the GDP. From the tables of critical values of t-Student it is seen that $\pm t_{\frac{\alpha}{2}}$ = ±2.120 for α = 0.05 and n - 2 = 16 degrees of freedom. The null hypothesis can be rejected in favour of the alternative hypothesis only when: $t_b < t_{\frac{\alpha}{2}}$ or $t_b > t_{\frac{\alpha}{2}}$, that is when $-t_b < -2.120$ or $+t_b > +2.120$.

The p-value is the probability of making a type I error. This would involve, based on the results of the test, the rejection of the hypothesis that the value of parameter β is zero, when in fact it is zero in the entire population. In other words, a type I error is a rejection of a real null hypothesis. The higher the value of the t-test means, the lower the probability of a type I error occurring. In general, it is assumed that if the p-value is less than 0.05, the null hypothesis can be rejected in favour of the alternative hypothesis, and thus it can be it can be claimed that there is a statistically significant relationship between the expenditure of EU Member States on State aid for sectoral development and the size of the GDP of these countries.

The second table contains regression statistics, including the correlation coefficient, determination coefficient, standard error and the parameters of the F test - that is, the value of F-test and the probability of making a type I error, when it is verified that expenditure on State aid does not impact the size of the GDP (the irrelevance of state aid expenditure in the regression model). Similar to the t-test described above, the F-test is used to test the significance of linear regression coefficient β evaluation. Statistic F with F-Snedecor distribution of k_1 and k_2 degrees of freedom is used to check this test. When rejecting the null hypothesis F > F_α of no relation between expenditure on State aid and the size of the GDP and accepting the alternative hypothesis of the existence of a statistically significant relationship between the variables. From the table of critical values of the F-Snedecor for k_1= 1 (1 independent variable) and k_2= n – 2 = 16 degrees of freedom and α = 0.05 we read $F_{0,05}$ = 4.49. Thus, the alternative hypothesis can be adopted only when: F > 4.49.

3   Results and Discussion

The most important statistical test in the simple regression analysis is a test of whether the regression coefficient equals zero. If it can be concluded that the directional coefficient of the real regression line in the population equals zero, it will mean that there is no linear relation between expenditure on State aid and the size of GDP, or expenditure on State aid and the size of

GDP are not linearly dependent. Therefore, there should be a test to determine the occurrence of the linear relation between expenditure on State aid for sectoral development in the Member States and the size of their GDP. Table 1 shows the statistics on this test.

Table 1: State aid for sectoral development and GDP – analysis of variance: the line "variable X"

EU Member States	Regression coefficient b	Standard error S_b	t Stat t_b	p-value	Lower 95%	Upper 95%
Austria	-934.92	687.84	-1.35921	0.192931	-2393.08	523.2367
Belgium	373.23	94.95	3.930849	0.001194	171.9451	574.5059
Bulgaria	-673.91	369.56	-1.82354	0.086958	-1457.36	109.5276
Cyprus	-28.87	2.93	-9.84023	3.44E-08	-35.0865	-22.6485
Czech Republic	1271.92	300.04	4.239189	0.000625	635.8677	1907.976
Denmark	466.46	141.97	3.285675	0.004658	165.5032	767.425
Estonia	1223.32	452.05	2.706142	0.015575	265.0101	2181.628
Finland	1039.34	259.24	4.009218	0.001012	489.7824	1588.904
France	-0.66	13.10	-0.05069	0.960203	-28.4355	27.10744
Germany	-118.74	19.43	-6.11212	1.5E-05	-159.931	-77.5605
Greece	111.32	52.65	2.114288	0.050541	-0.29577	222.926
Hungary	-24.33	17.23	-1.41232	0.17701	-60.8486	12.18932
Ireland	-323.66	71.03	-4.55652	0.000323	-474.241	-173.078
Italy	-36.66	21.53	-1.70217	0.10807	-82.3057	8.995689
Latvia	24.59	7.49	3.280494	0.004709	8.701258	40.4883
Lithuania	2192.33	800.28	2.739451	0.014546	495.8106	3888.853
Malta	-52.36	10.33	-5.06995	0.000114	-74.2486	-30.4647
Netherlands	193.99	395.34	0.490681	0.630314	-644.122	1032.109
Poland	-26.47	23.11	-1.14508	0.269016	-75.4739	22.5342
Portugal	-13.09	3.53	-3.70694	0.001914	-20.5757	-5.60412
Romania	-175.77	66.23	-2.65405	0.017325	-316.157	-35.3741
Slovakia	-382.75	123.43	-3.10109	0.006864	-644.399	-121.102
Slovenia	-46.64	427.07	-0.10921	0.914394	-951.982	858.702
Spain	-116.72	16.79	-6.94992	3.27E-06	-152.322	-81.1172
Sweden	447.05	414.31	1.079044	0.296567	-431.234	1325.342
United Kingdom	-1583.1	410.33	-3.85799	0.001392	-2452.91	-713.188
EU 28	-153.55	42.41	-3.61989	0.002301	-243.465	-63.6247

Source: The author's own calculations.

Table 1 shows that for seven Member States (Belgium, Czech Republic, Denmark, Estonia, Finland, Latvia, Lithuania), the regression coefficient takes a positive value. Consequently, the increase in expenditure on State aid for sectoral development by €1 is accompanied by an increase in GDP by average: €373.23, €1271.92, €466.46, €1223.32, €1039.34, €25.59 and €2192.33. Margin of error is: €94.95, €300.04; €141.97, €452.05, €259.24, €7.50 and €800.28. Bearing in mind, however, the confidence interval for the regression coefficient, it is nearly certain (95% probability) that an increase in sectoral State aid of €1 will cause GDP to rise in the following countries: Belgium from €171.95 to €574.51, Czech Republic from €635.87 to €1907.98, Denmark from €165.50 to €767.43, Estonia from €265.01 to €2181.63, Finland from €489.78 to €1588.90, Latvia from €8.70 to €40.49 and Lithuania from €495.81 to €3888.85. It should also be noted that the probability of type I error (p-value), involving the rejection of a true null hypothesis that, in the case of these seven countries providing State aid for sectoral development do not significantly affect the size of the GDP of the countries, is below the accepted level of significance, i.e. 0.05. The consequence is that the result of the study in relation to these countries, may be considered important, and thus the null hypothesis can be rejected in favour of the alternative hypothesis.

Also for 9 Member States, i.e. for Cyprus, Germany, Ireland, Malta, Portugal, Romania, Slovakia, Spain and United Kingdom, the regression coefficients take negative values, which means that the expenditure on State aid for sectoral development have a negative impact on GDP

of these countries. The increase in expenditure on sectoral State aid by €1 is accompanied by a fall in GDP - respectively – with an average of €28.87, €118.75, €323.66, €52.36, €13.09, €175.77, €382.75, €116.72 and €1583.05. Estimation errors are respectively €2.93, €19.43, €71.03, €10.33, €3.53, €66.23, €123.42, €16.79 and €410.33. On the other hand taking into account the confidence interval for the regression coefficient it can be with a probability of 95% said that the increase in expenditure for State aid of €1 will cause fall in GDP by the value of the interval (€22.65; €35.09) for Cyprus, (€77.56; €159.93) for Germany, (€173.08; €474.24) for Ireland, (€30.46; €74.25) for Malta, (€5.60; €20.58) for Portugal, (€35.37; €316.16) for Romania, (€121.10; €644.40) for Slovakia, (€81.12; €152.32) for Spain and (€713.19; €2452.91) for United Kingdom. For these countries the probability of making a type I error, connecting with the rejection of a real null hypothesis concerning lack of relation between the size of the State aid and the value of GDP, is very small and does not exceed the accepted level of significance of 0.05. Identical request as to the proposed hypothesis can be obtained by analyzing the value of F test and F significance. Table 2 shows the F-test parameters and regression statistics for the relationship between the amount of State aid for sectoral development and the value of GDP in the EU countries.

Table 2: State aid for sectoral development and GDP - regression statistics and F-test

EU Member States	Regression statistics			Test F	
	Correlation indicator	Determination coefficient	Standard error	F	Significance F
Austria	0.321735	0.103514	47357.5	1.847456	0.192931
Belgium	0.700915	0.491281	41556.14	15.45157	0.001194
Bulgaria	0.414812	0.172069	11317.39	3.325283	0.086958
Cyprus	0.926388	0.858194	1176.135	96.83006	3.44E-08
Czech Republic	0.727328	0.529006	27078.32	17.97072	0.000625
Denmark	0.634735	0.402888	27613.72	10.79566	0.004658
Estonia	0.560346	0.313988	4560.235	7.323206	0.015575
Finland	0.707920	0.501151	19279.64	16.07383	0.001012
France	0.012671	0.000161	258831.8	0.002569	0.960203
Germany	0.836743	0.700139	200621.9	37.35804	1.5E-05
Greece	0.467308	0.218376	26326.45	4.470212	0.050541
Hungary	0.332937	0.110847	18369.4	1.994652	0.17701
Ireland	0.751510	0.564767	33634.17	20.76192	0.000323
Italy	0.391563	0.153322	132761.4	2.897375	0.10807
Latvia	0.634137	0.402129	4920.474	10.76164	0.004709
Lithuania	0.565050	0.319282	7947.247	7.504589	0.014546
Malta	0.785078	0.616347	1331.375	25.70437	0.000114
Netherlands	0.121758	0.014825	85112.43	0.240768	0.630314
Poland	0.275215	0.075743	92986.59	1.311208	0.269016
Portugal	0.679727	0.462029	13775.25	13.7414	0.001914
Romania	0.552880	0.305676	40227.65	7.043994	0.017325
Slovakia	0.612706	0.375408	17767.00	9.616738	0.006864
Slovenia	0.027292	0.000745	6432.851	0.011927	0.914394
Spain	0.866702	0.751172	80985.31	48.30138	3.27E-06
Sweden	0.260451	0.067835	69154.01	1.164337	0.296567
United Kingdom	0.694215	0.481934	182691.7	14.88409	0.001392
EU 28	0.670999	0.450239	1314746.0	13.10358	0.002301

Source: The author's own calculations.

In the case of Belgium, Czech Republic and Finland, one can speak of a strong correlation of aid granted in the agricultural sector with the amount of their GDP in a positive sense. Correlation indicators are equal, respectively 0.70, 0.73 and 0.71. But these models have a weak fit to the empirical data, as its calculated coefficient of determination is 0.491281, 0.529006 and 0.501151. Therefore, variations in GDP in these countries were explained in 49.13%, 52.90% and 50.12% with variations in expenditure on State aid for sectoral development, while the remaining 50.87%, 47.10% and 49.88% result from the impact of other factors.

In the case of Denmark, Estonia, Latvia, Lithuania, the values of the correlation coefficient are included in the interval (0.56; 0.63). These countries are characterized by weak positive relationship occurring between the amount of provided State aid and the level of their GDP. Moreover, there can be no satisfactory adjustment of the regression line to the empirical data. The determination coefficients for these countries equal: 0.402888, 0.313988, 0.402129 and 0.319282.

In the case of Cyprus, one can speak of a very strong correlation of aid granted for sectoral development with the amount of GDP in a negative sense. The correlation indicator equals: 0.93. This model has a good fit to the empirical data, as its calculated coefficient of determination is close to 0.90. For Cyprus determination coefficient is 0.858194. Therefore, variations in GDP in this country were explained in 85.82% with variations in expenditure on sectoral State aid, while the remaining 14.18% result from the impact of other factors. If the coefficient of determination takes the values less than 0.5, the regression explains only less than 50% of the variation in GDP and predictions based on such a regression model may be unsuccessful because the regression model explains then very little. **This means that the predictions can be created basing on the Cypriot model, because the regression model is characterised by a good fit and is little burdened with the estimation error, which provides grounds for precise forecasting.**

Germany, Ireland, Malta and Spain are characterized by occurring between the amount of provided State aid for sectoral development and the level of GDP, very strong and strong negative correlation - respectively 0.84, 0.75, 0.79 and 0.87. In the case of Germany and Spain, for which the determination coefficient has the highest value, the variability of GDP in the real terms was explained in 70.01% and 75.12% by variability of expenditure on State aid for sectoral development. The remaining 29.99% and 24.88% is the effect of random and non-random factors (other non-aid variables, imprecise fit of a straight line to the empirical data etc.).

For Ireland, Malta, Portugal, Romania, Slovakia and United Kingdom the determination coefficient assumes lower values and amounts to 0.564767, 0.616347, 0.462029, 0.305676, 0.375408 and 0.481934. This means that there can be no satisfactory adjustment of the regression line to the empirical data.

For all countries of the European Union (EU-28) between the amount of State aid for sectoral development and GDP in the real terms, there is a negative correlation (r = -0.67). However, the determination coefficient assumes lower values and amounts to 0.450239. This means that there can be no satisfactory adjustment of the regression line to the empirical data.

4 Conclusion

State fiscal policy and its consequences, particularly tax policy implemented within its frames (specifying the implementation of public revenue) and State aid policy (depending on the instruments of implementation - affecting both the expenditure and the revenue side of public finance sector), are closely linked with the real economy. The issue here is primarily about the relationship between the size of and changes in GDP, and changes in public funds. Changes in GDP affect changes in the revenue of the State budget and of other public funds— that is, the revenue of the entire *general government* sector. These correlations result from the fact that taxes and other public levies are part of GDP in revenue terms. Revenue generated in the process of creating GDP thus affect its consumption, but this correlation is non-linear, because part of the revenue is spent on monetary savings of individuals and entities operating in the economic system, mainly household savings. If these savings are to be transformed into demand for goods, especially goods for investment purpose, many factors will come into play, particularly the credit policy of banks or other financial system players whose function is to transform savings into capital provided to enterprises.

In the process of creation and distribution of GDP a significant function is performed by the State, which by taking in the form of taxes and other public levies some part of the revenue

generated by households and enterprises, changes the structure of aggregate demand in the economy. The taxes imposed on enterprises limit their investment opportunities, but revenues from taxes and other levies are directed by the State to both households (social assistance, unemployment benefits, scholarships etc.) and to enterprises (State aid in the form of grants), forming the basis of demand for consumer goods and investment goods. State expenditure policy, which includes the policy of State aid to enterprises, can thus give an impulse to GDP growth and increase the indicator GDP *per capita* (growth of competitiveness of the national economy) even if the State spends more money than the accumulated revenue in the budget. This situation means the appearance of budget deficits, which accumulation in the coming years leads to the formation of public finance sector debt. The source of financing deficits, and as a result public debt, are domestic monetary savings, relatively foreign. This process is accomplished by a loan taken out by the state in the form of debt securities, which buyers are banks, investment funds, insurance companies, etc., that is, institutions that accumulate monetary savings of the economic system entities, mainly households. Fiscal policy therefore plays an important role in economic growth, especially in a situation where enterprises, commercial banks, for various reasons, e.g. increased risk of capital loss, are not willing to support real economic processes (investment processes) and economic growth. The savings accumulated in commercial banks and other financial institutions are thus borrowed by the state, which creates the demand for consumer goods and investment goods, consequently stimulating the processes of economic growth.

Sectoral aid may pursue various objectives. Aid for the benefit of the coal mining industry and certain manufacturing sectors serve either mainly to cushion the social impact of structural changes in connection with the decline of an industry, or to combat unfair price competition in the worldwide dockyard industry. In contrast, the majority of aids in certain service sectors benefit those branches whose importance are steadily growing, such as tourism, or liberalized sectors such as air transport and financial services.

In the case of growth industries, the Member States are being encouraged to provide support particularly in the area of research and development. Of primary importance, however, are those industries experiencing structural crises and difficulties in adapting to a changed environment. This applies in particular to the shipbuilding industry. The European Commission here takes the view that aid should be approved where it is necessary to promote or accelerate essential changes or developments in the industry, to make a smooth adaptation of specific industrial activities possible, or at least to neutralize distortions of competition that have been brought about by measures taken outside of the European Union.

The proposed research thesis in the paper, according to which, both in relation to the European Union and its individual Member States, the amount of expenditure on State aid for sectoral development is positively correlated with the rate of GDP should be rejected. It cannot be considered as a true the thesis that with increasing the amount of sectoral aid the competitiveness of the EU economy increases. It was incorrect to assume that this correlation occurs for all Member States, because of the amount spent on State aid for sectoral purposes are very different at the level of individual Member States. Different is also the proportion of aid actually granted in the aid approved by the European Commission.

The above outlined description of the relation between the real sphere and the fiscal sphere is necessarily greatly simplified. It provides a subject for theoretical investigation and empirical analysis, while econometric models, which aim to quantify these relations, combine them in a cause-and-effect structure. It is essential that these relations be ascertained with the analysis of such policy aid - concerning regional goals, sectoral and broadly understood horizontal goals - conducted within the framework of fiscal policy used by a given State or group of EU Member States. Presented in the article regression analysis of State aid with sectoral objective in the field of development and GDP contributes to comparative studies among countries conducting fiscal policy in the conditions of the single monetary policy and the countries outside the euro area.

Acknowledgements

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Costs and Benefits of the Dual Vocational Training System and its Use in the Czech Republic

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Abstract

Apprenticeship in the Czech Republic suffers from poor quality, low motivation of pupils to complete successfully this type of education, and high unemployment rate of graduates. Dual vocational training system seems to be a possible solution to these problems. This system is increasingly seen as an important educational track that provides youth with the skills necessary for a smooth transition into the labor market. However, the practical part of the dual system provided by companies brings the cost for companies that hire apprentices. Because apprentices become part of a company's workforce, they also generate a benefit from working productively. The aim of this paper is to analyze costs and benefits of the dual system and to estimate the net costs of training hypothetical company in the Pardubice Region. Based on the resulting net costs of this hypothetical company, company's investment in apprenticeships should start returning in the second year, and the benefits should outweigh the costs in the third and fourth years, too. Further, by correlation and regression analysis, we found that there is a statistically significant influence of length of practice in the company on youth unemployment rate and completion rate of upper secondary school pupils. The importance of time spent in training company has been confirmed.

Keywords: dual vocational training system; apprenticeship; costs; benefits; training company

JEL Classification: I220, H410, I290

1 Introduction

The most frequent problems of upper secondary education in the Czech Republic are discussed in upper secondary vocational schools, especially in apprenticeships. In this type of schools, the quality of teaching is very low and this education is very uneconomical or inefficient: consumption of high finance without added value in the form of successful graduates. There is a high degree of failure in this study, a high number of upper secondary school pupils leaving this education system before passing a final exam [5]. Apprenticeship graduates show the highest unemployment rate in the labor market [8]. Research [13] shows that one of the most frequent employers' demand is the practice of applicants. However, apprentices spend little time in the real work environment in the Czech Republic. Practical training time takes an average of 63 - 68 days in the 1st - 3rd year in this type of education. As a disadvantage, employers also indicate the length of time that graduates need to integrate when starting work.

The solution to these problems can be the implementation of the dual vocational training system. In this case, practical training would take place in the real economy, companies could shape the apprentices' professional profile according to their needs and this preparation would be the first real "practice" of apprentices. The dual system could ensure consistency between supply and demand in the labor market. According to Deissinger and Hellwig [4], the dual system is an institutional framework, which is subdivided into two learning venues: the company or master providing on-the-job training (the actual apprenticeship) and the part-time vocational school where the apprentice receives theoretical instruction. Germany's dual system of training provision, which has a long history, has become a key inspiration for vocational training reforms around the world. Hamilton [6] and Senker [17] state that countries such as France and Britain see the German system of vocational education and training as "a model to copy". From a financial point of view, the dualism is reflected in a shared responsibility for funding between companies and state governments.

Vocational education and training (VET) provides useful skills to improve youth chances of a successful professional career [11]. In particular, by aligning the initial education more closely to particular vocations and tasks demanded in the labor market, the problem of mismatch, often seen as a main source of the high degree of unemployment in countries, may be reduced [1].

The aim of this paper is to analyze costs and benefits of the dual system based on experience in countries where this system is used. Within this objective, the net costs of training hypothetical small or medium-sized enterprise (SME) in the Pardubice Region will be estimated. Length of practice seems to be a key factor in the success of graduates in apprenticeship education. By correlation and regression analysis, we find out whether there is a statistically significant influence of length of practice on youth unemployment rate, GDP per capita, and completion rate of upper secondary school pupils.

2 Material and Methods

The substantial benefit of dual system is the smooth transition of young people between school and employment, where young people often get their first jobs in companies where they have practiced, which has impact on the youth unemployment rate. Another positive feature is the high rate of successful completion of upper secondary education, and the country with a dual system also achieves higher GDP per capita (but this indicator is influenced by many other factors, including the mentioned unemployment rate). These statements are illustrated by the following Table 1, which highlights the countries that use the dual system for their vocational training.

Table 1: Benefits of the dual system

Country	Relative youth unemployment rate (15-24 years) in %	GDP per capita	Completion rate of upper secondary education (in %)	Employment rate of graduates of upper secondary vocational schools (20-34 years) in %
Austria	**1.8**	**44 152.2**	**94.4**	**89.2**
Belgium	2.7	41 713.9	89.6	72.2
Czech Republic	2.7	31 808.6	77.6	87.5
Denmark	**1.9**	**45 704.2**	**92.6**	**82.8**
Finland	2.3	39 710.5	96.2	77.0
France	2.4	37 648.2	93.8	64.0
Germany	**1.8**	**44 108.1**	**91.6**	**91.3**
Hungary	2.6	25 842.4	87.4	85.9
Netherlands	1.8	48 020.0	93.4	86.9
Poland	3.0	26 154.7	85.2	75.2
Slovak Republic	2.3	29 931.0	83.8	81.6
Spain	2.2	33 729.2	80.2	58.5
Sweden	2.7	45 535.1	74.0	87.8
Switzerland	**1.7**	**54 690.8**	**95.2**	**85.1**
Great Britain	2.8	39 338.6	91.8	82.0

Note: Completion rate of upper secondary education measures the number of pupils entering the upper secondary level and complete this program within a given timeframe; Relative youth unemployment = share of unemployment rate by age group 15-24 years old and unemployment rate by age group 15-64 years old.
*Source: Education at a Glance 2017, Eurostat, OECD.Stat.*

To prove that the dual system (expressed as the time spent in practical training in the company) is causing the aforementioned benefits, we used correlation and regression analysis, where the dependent variable were selected relative youth unemployment rate, GDP per capita and completion rate of upper secondary education and independent variable represents the

time spent in practical training in the company. According to Kubanová [9] the correlation analysis is used to determine the extent to which variables interact. The Spearman's correlation coefficient 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. We used simple regression model. Simple regression describes the dependency of the explained variable on one independent variable (one regressor).

An important contribution to the state is also the involvement of more actors in the financing of the dual system. Vocational training in schools is funded from public sources, but vocational training in companies is paid directly by employers. In Slovakia, Germany, the Netherlands and Austria, companies can reduce the corporate income tax base. E.g. in the Netherlands, a company has the option of applying a tax allowance of € 2,500 for each job filled by the apprentice, whereby companies spend € 8,400 on average per apprentice per course. So the bulk of the company's training is still covered by the company itself. A similar situation exists in Austria or Germany, where most of the costs of training in dual education are borne by employers [3].

For companies involved in dual education, it is important that they will earn a return to their investment in training to compensate for costs, which they have to bear [18]. Training costs (e.g. personnel expenses, training workshops, machines, materials, apprentices' remuneration, etc.) must as far as possible be covered by the productive performance of apprentices within the time of training. Dual education must be paid economically to the company at least from medium and long term, so that companies are willing to offer places to this education.

Figure 1: Productive performance of apprentices (%)
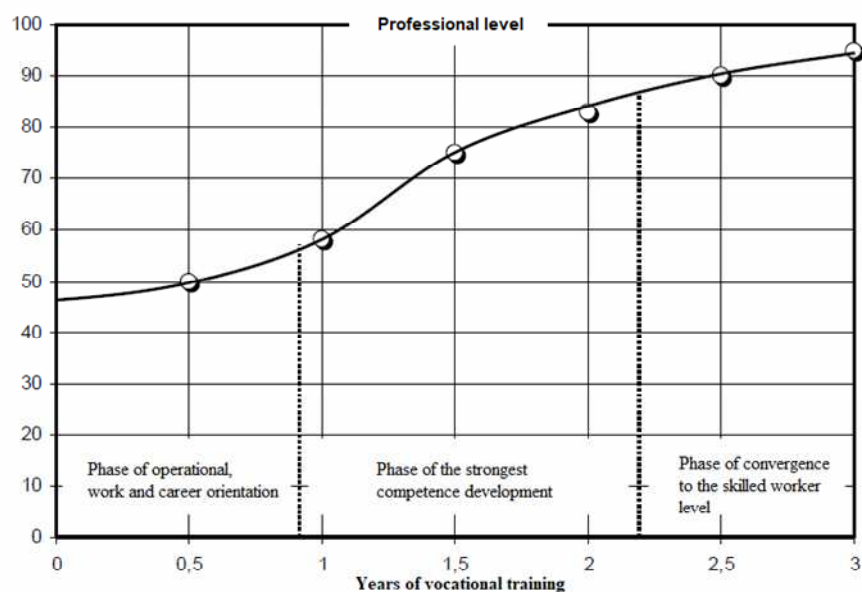
Source: Rauner [16].

From this picture and according to Potter [14] it is clear that competencies and productivity of apprentices increase over time. Companies that provide dual education, cover their need for professional staff, are becoming more independent on the labor market, thereby increasing their competitiveness. These companies are also gaining recognition and improving their image.

As Lerman [10] says, dual system provides a very strong signal for detecting skills shortages identified by enterprises. Also valuable is employers' increased certanty that apprenticeship graduates know all the relevant occupational and company-specific skills, and can work well alongside other skilled workers. The high level of occupational mastery achieved

by apprentices may also increase the pace of innovation and the ease of implementing new technologies.

When estimating the costs and benefits of training hypothetical company in the Pardubice Region, we use the methodology of Hanushek, Machin and Woessman [7]. The calculation of training costs suggests that they are mainly determined by wages. In addition, there are expenses for material, infrastructure, external courses, costs for hiring and administration of apprentices, and other (X). Briefly, the gross costs (C) of an apprentices (i) at a training site (j) and in an apprenticeship year (t) comprise primarily the apprentice's wages ($_aw$), the trainers' wages ($_bw$), and the material expenses (X) involved in providing the training (see formula 1). We consider that material expenses account for 15 % of total costs. We base on the situation, that personnel costs already constituting about 85 % of the total gross cost of training in most countries with a dual system [19]. The number of training years is n. For simplicity, there is no discounting.

$$C_{ij} = \sum_{t=1}^{n} {}_aw_{ijt} + {}_bw_{ijt} + X_{ijt}$$

(1)

The benefits (B) derived by the company from training during the training period comprises the production generated by the apprentices. The benefit is calculated on the assumption that the productive work done by an apprentices would be performed by either skilled or unskilled workers. Allowance is made for the possibility that not all of the work of apprentices is productive and that some apprentice time is spent on exercises. The benefit is broken down into production activities that would otherwise be performed by unskilled workers (P_l) and skilled workers (P_{ll}). It is assumed in the first case that the apprentice's performance has the same value as that of the average unskilled employees. In the second case, the value of the apprentice's performance (relative productivity) is estimated by comparison to that of fully skilled workers (γ). The values of the apprentice's work has to be adjusted by a relative productivity measure (we use the data from Figure 1), since apprentices are not yet as efficient as a skilled worker with a vocational degree. Type I production is multiplied by the wages paid to an unskilled workers ($_uw$), while for type II the wages paid to a skilled workers in the relevant occupation ($_pw$) are used (we use the average annual wages in the Pardubice Region for 2017 for auxiliary and unskilled work and for craft and repair work as a skilled work). As is to be expected, the proportion of type I productivity (α) varies according to the year of apprenticeship and in general declines as the apprenticeship progresses, while the share of skilled work, with higher apprentice productivity (γ), increases as the training proceeds. The benefit is counted according to the following formula:

$$B_{ij} = \sum_{t=1}^{n} \alpha_{ijt} * {}_uw_j + (1 - \alpha)_{ijt} * {}_pw_j * \gamma_{ijt}$$

(2)

The net costs of apprenticeship training (NC) are the difference between the costs (C) and the benefits (B):

$$NC_{ij} = C_{ij} - B_{ij}$$

(3)

We used the Slovak Act no. 61/2015 on Vocational Education and Training (Dual Education) to modify this general calculation procedure. We have applied the rules of this law for determining apprentices' remuneration, the tax savings, and contribution to training apprentices from the state. This contribution is paid once in Slovakia on 30 June for each apprentice to which company has provided practical training in a dual education system. For

SMEs, the amount of the grant is set at € 1000/apprentice. This Slovak Act introduces the elements of the dual system, not the dual system in the pure form, such as in Germany. This country was chosen because of the similarity with the Czech Republic, i.e. a similar historical and economic development, and similar problems in the labor market. For our calculation, we used small or medium-sized enterprise because this category has the largest numerical share of all companies in Pardubice region (99.14 %). The percentage of SMEs for the whole Czech Republic is very similar (99.84). However, the vast majority of these companies are small companies. The small size category means that these companies have between 0 and 49 employees, medium-sized companies have 50 - 249 employees and large companies have more than 250 employees.

3 Results and Discussion

First, we find out whether there is a statistically significant influence of length of practice on the above-mentioned benefits of the dual system from Table 1. We performed correlation and regression analysis. The results of correlation analysis are shown in Table 2. The correlation coefficients were determined for confidence intervals of 95 % and 99 %.

Table 2: Impact of time spent in practical training in the company on selected variables

Indicator	Time spent in practical training in the company
Time spent in practical training in the company (in %)	1.000
Relative youth unemployment rate (15-24 years) in %	-0.624**
GDP per capita	0.211
Completion rate of upper secondary education (in %)	0.908***

Note: statistically significant values that are significant: *** at a confidence interval of 99 %; ** at a confidence interval of 95 %, * at a confidence interval of 90 %.
Source: Authors.

From the correlation coefficients, the time spent in practical training in the company has a strong negative impact on the relative youth unemployment rate (r = -0.624), and very strong positive impact on the completion rate of upper secondary education (r = 0.908). These two significant variables entering the regression model. The value of the determinant coefficients for the following statistically significant indicators are as follows: 0.480253 for the relative youth unemployment rate, and 0.609027 for completion rate of upper secondary education. The regression analysis results show that indicators explain the model with a relatively high percentage. Relative youth unemployment is influenced by the time spent in practical training of 48 %, and in the case of completion rate of upper secondary education it is about 61 %.

Table 3 represents the estimated costs, benefits and resulting net costs of the hypothetical company in the Pardubice Region. This company trains six apprentices. This number is based on the assumption that our hypothetical company uses 1 instructor for practical training and one instructor can lead at the same time a maximum of 6 apprentices (according to Czech legislation). Number of apprentices may be arbitrary for the calculation methodology, depending on the company's personal and material capabilities. Years are defined as calendar years from the perspective of the company but the 3-year length of the curriculum is considered (the first year begins on 1 September and the fourth year ends on 30 June). Considered number of training hours of apprentices in the company is given in brackets for each year. Total number of training hours for all four years is 1 400. This number of hours is the lowest possible for dual education according to the Slovak Act mentioned above.

Period	1st year (186 hours)	2nd year (467 hours)	3rd year (467 hours)	4th year (280 hours)
Costs				
apprentices' remuneration	32 779	92 771	119 538	81 626
Trainers' wages	35 293	88 611	88 611	53 129
Material expenses	12 013	32 009	36 732	23 780
Total costs	**80 085**	**213 391**	**244 881**	**158 535**
Benefits				
Production generated by the apprentices	58 521	173 704	251 845	185 161
Tax savings	0	94 348	94 348	47 174
Contribution to training apprentices from the state	0	155 178	0	0
Total benefits	**58 521**	**423 230**	**346 193**	**232 335**
Net costs	**- 21 564**	**+209 839**	**+101 312**	**+73 800**

Note: tax savings = absolute tax savings after the application of a flat-rate tax of EUR 3 200 per pupil or EUR 1 600 per pupil according to the number of hours of training provided per year.
Source: Authors.

The resulting net costs over the reference years show that the initial investment in apprentices will return to the company for the second year. In the second year, however, the excess of benefits over costs is mainly due to a contribution to training apprentices from the state. From the second year, company can also use a tax deduction from its tax base. You can see that the benefits from production generated by the apprentices are increasing with increasing time and apprentice's remuneration are rising, too. This growth is due to increasing productive performance of apprentices (Figure 1). From the calculation follows that the more hours the company provides in dual education, the greater the net benefits it achieves. Because of the increasing productivity of apprentices (increasing benefit), training company has an interest in a sufficiently long training duration to recoup its initial training investments as apprentices become more productive later in the training period. Put differently, the amount of training that company is willing to provide increases with increasing training duration [15].

The costs and benefits of apprenticeship training are an important determinant of a company's decision to hire apprentices, which Mühlemann [12] for Germany and Switzerland dealt with. He found that German company on average makes a net investment of EUR 5 400 per year per apprentice, the average Swiss firm generates a net benefit of EUR 2 300 per year per apprentice. Two factors explain this difference. First, the relative pay of apprentices is around twice as high in Germany as in Switzerland. Second, there are marked differences in the tasks allocated to apprentices when they work in production. German apprentices spend more time doing practice exercises, Swiss ones doing productive work, and particularly doing skilled tasks. It has to be noted that, in contrast to our research, this research was carried out on the already existing dual education in companies. Mühlemann calculated the average costs and benefits of 3 032 companies in Germany and 2 518 companies in Switzerland. We used the same methodology with slight differences given by the Slovak Act.

Wolter and Mühlmann [19] simulated the hypothetical costs and benefits of apprenticeship training for the case that Spanish companies were to start dual apprenticeships similar to Switzerland or Germany. The simulations show that there would be at least one scenario for each of the analyzed occupations so that training companies could reach the break-even point by the end of the training period (i.e. without having to rely on post-training benefits). A potentially important component of post-training benefits are savings on future

hiring costs. Retaining apprentices upon completion of their training eliminate the costs of externally recruiting and familiarizing new skilled workers. Blatter, Mühlemann and Schenker [2] show that average hiring costs range, depending on company size, from 10 to 17 weeks of wage payments. Larger companies have higher rents, which authors explained by longer average interview times.

Small companies can expect smaller net training benefits or may have to bear net costs, while larger companies can expect net benefits. This pattern leads to a situation in which medium-sized and larger companies are more likely to offer training than small companies. From the calculation methodology used follows that the more number of apprentices the company employs, the lower the net costs reaches. Employing more apprentices can afford larger companies. Large companies with numerous apprentices have the possibility of economies of scale and training costs reduction. Because small companies are the backbone of the economy in many countries (case of the Czech Republic), special incentives, such as access to training funds and technical assistance with the training of tutors are important [19].

4 Conclusion

Our research has confirmed the importance of the length of practice in company within the vocational training. Correlation and regression analysis showed that the time spent in practical training in the company has statistically significant negative impact on the relative youth unemployment rate and positive impact on the completion rate of upper secondary education. However, the limit of this analysis is the need to consider the results with caution because there might be some other different factors affect the youth unemployment rate or GDP. Estimated costs and benefits of training hypothetical company in the Pardubice Region consists of two main components. First, the costs that arise during the training period (apprentice's wages, trainers' wages, material expenses); second, the benefits that company can generate during the training period by letting apprentices substitute unskilled and skilled workers (saved wages of unskilled and skilled workers - production generated by the apprentices). It is also calculated with tax savings and with one-time contribution to training apprentices from the state. Based on the resulting net costs of this hypothetical company, company's investment in apprenticeships should start returning in the second year, and the benefits should outweigh the costs in the third and fourth years, too. The net costs also depends on the size of the company - the larger the company, the lower the net costs and the higher the benefits. The share of medium-sized companies in the total number of companies in the Czech Republic is only 0.7 %. Most companies are small companies. The dual system in its pure form, as it works in Germany, is difficult to apply for this reason. A solution would be the cooperation of schools with several companies. In small companies, there is a further risk that not all employers are able to train apprentices all activities and skills required by the graduate's profile and some employers use obsolete production facilities. When employing small companies for apprenticeship training, they need to be financially supported by the state. Also in our calculation, state funding in the form of tax savings and contribution to training apprentices appears to be a key factor in the excess of benefits over costs. From this point of view, the dual system seems very costly for public finance. However, it is necessary to consider the significant benefits that are difficult to quantify. For example, a smoother transition of graduates to the labor market, ensuring the needs of the labor market, or limiting non-prospective fields. The limit of this analysis is the fact that the estimated costs and benefits of a hypothetical company, not a real company are calculated. At present, the introduction of the dual system as a solution to problems of vocational education is discussed topic in the Czech Republic. Pilot projects are currently underway, introducing elements of the dual system. Also, some companies are actively seeking to work more closely with apprentices because of a lack of labor force. Further research could analyze the costs and benefits of the dual system of these involved companies and get more realistic results.

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Talent Management in Public Healthcare

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Abstract

Talent management has gained more and more attention in recent years; however, current research focuses mainly on developing concepts, constructions and definitions. Despite numerous studies, talent management has not been the subject of extensive research in reference to different types of organizations. In healthcare organizations, the demand for highly qualified employees, who can be considered as talents, is emphasized. Employees with exceptional abilities are a valuable, rare and sought after resource. Until now, studies on talent management in healthcare organizations are rare, and the need for such research is self-evident. Difficult economic conditions and strong employment trends are a serious challenge for talent management in healthcare organizations. Specialists in the field of talent management in healthcare have to constantly pursue three strategic goals: cost reduction, improvement of patient satisfaction and improvement of patient safety. The purpose of this article is to assess the current state of talent management in healthcare organizations and the steps that can be taken to move closer to the high impact talent management function. The methodology was based on the analysis of the literature on the subject concerning public healthcare organizations in the world and own research. Effective talent management can help health care organizations save time, money and reduce inefficiencies.

Keywords: talent management; public healthcare; hospitals.

JEL Classification: M12, M54, I15, O15, J24

1 Introduction

Recently scientific research has been paying special attention to talent management. This is very interesting because of its ability to create and maintain competitive advantage of the entities [3, 14]. Talent management is one of the processes of human resources management, which has lately become the point of special interest. This process looks a bit different depending on the definition of talent and on what the organisation wants to achieve through this management. There are two approaches: the first one focuses on the key, outstanding employees called talents; the other one focuses on all employees, treating each of them as a potential talent. Talent management is described as a complex process, which includes recruitment of right candidates (that is war for acquiring talents), their retention at company and providing them with chances for development and promotions. The process of talent management is supported by information systems and applications enabling better exploitation of potential of organizations. Basically, talent management is associated with creation of a bank of talents from internal and external sources, appropriate usage of those resources in key positions and further work on motivation, organizational engagement and other behaviour patterns, which are important for the results of an organisation [13]. This perception of talent management focuses on replacing the concept classical approach with human resources management. This means that the entity that wants to actively engage talents in organisational life, has to find the ways of utilising their own capabilities and preparing a strategy to encourage its own outstanding employees to contribute to the organisational success.

Despite a growing interest in the research in this area, there is not much knowledge about the ways in which public organisations, especially public healthcare entities manage their talents. This article was created to fill up this gap and its objective was to analyze the literature studies on talent management in public healthcare entities. This aim was accomplished in two stages. Firstly, there was research on the latest literature on the subject of talent management and the directions in which the scientific debate is carried on. Secondly, the review of the

empirical research was conducted in selected public healthcare entities in the world, own research and theoretical as well as practical implications were formulated.

2 Material and Methods

Methodology is based on the analysis of the literature about public health care organisations around the world. Having in mind that public healthcare organisations are absolutely crucial for the society, the results of the research done on the management of extraordinary employees in the world health care organisations were presented in this article. Effective talent management may help public health care organisations to reduce the lack of efficiency and save time and money. The literature related to talent management was identified in a number of ways. A targeted review of the literature over the past ten years was undertaken at the beginning of the research. This was supplemented throughout the duration of research by continuous monitoring of other relevant internet based information sources.

The review of the literature on talent management (books and press publications) was commenced by the author in October 2018. The searches were done using also the following databases: EBSCO, Scopus, ProQuest and Web of Science. The first search strategy used the following search terms: "talent management", "human capital management", "human capital development" and "human resource planning". However, this generated several thousand hits. As a result, it was decided to use the singe term "talent management" and limit the search to the previous 20 years of publications in order to identify the key documents on the subject.

To verify effectiveness of talent management in public healthcare, the review of recent research done by the entities from around the world was performed. In total, I collected 38 documents on the subject. The results of these analyses will be discussed in the next section.

My own empirical research was based on three semi-structured interviews, conducted in health care organizations in Poland in the Mazowieckie Voivodeship. On the basis of the literature studies I prepared the research questionnaire regarding talent management in healthcare organizations. The data was collected by means of interviews on the basis of open-ended question. In every organization the respondents were employees with deep knowledge about organizational strategies, policies and practices. The study finished in December 2018.

3 Results and Discussion

There are a few interesting scientific paths taken by scientists in the area of talent management. This article presents only a fragment of this diversity to emphasise its significant impact on the considerations. This allows creation of theoretical background for this area of research. It is crucial to define the concept of talent and character and essence of talent management.

The definition of talent is interpreted differently by particular authors. Talent is deemed to denote a person who has appropriate predispositions and abilities [11]. From the psychological point of view talent is an individual who is aware of his unique predispositions and interests more than an average person. They are able to notice the relation between own features and possibilities of education and career [1]. Such a person consciously takes care of their strengths and notices their impact on their future development [32]. In wider approach, a talent is a person, who exhibits creativity, extraordinary skills, professional commitment, satisfaction from achievements and self-improvement [4]. The relation between talent and realisation of organisational goals is often emphasized as well. Talent is a person who has potential, motivation, skills and knowledge, thanks to which they have an impact on functioning of the organisation by achieving extraordinary results. That individual achieves entrusted goals and simultaneously takes care of their own development [23]. The definition of a talent can be viewed from different perspectives, treating it as: competences appreciated by the organisation or group of people, predispositions crucial for success of that individual, taking actions that will help to discover and develop outstanding features [7].

Comparative analysis of definitions of talent leads to the following conclusions:

- Skills and potential are the main characteristics of talent. The other ones are motivation, value system and practical skills.
- The actions characteristic for a talent are: creation, composition, inspiration, innovative behaviour and positive impact on other people. In terms of mental processes: sensation, perception and understanding.
- A talent has impact on: the organisation, afterwards on broadly defined effectiveness of the employee and later on development in conjunction with passion.

Analysis of the literature shows that univocal definition of talent is difficult. Therefore, there are many possibilities and each of them will be correct if it takes into account the needs of an organisation [32].

To investigate this definition in context of talent management it is crucial to remember to interpret talent not only as a person who represents extraordinary abilities but also an employee who through their engagement and self-development contributes to the success of the organisation.

Table 1: Definitions of talent management

Author	Definition of talent management
Wellins, Smith, Mc Gee	Recruitment, development, promotion and retention of talents, planned and pursued according to present and future goals of the organisation.
Clake, Vinkler	Action including identification, development, retention and utilisation of talents in context of the given organisation.
Listwan	A set of actions regarding outstandingly talented people, taken with regard to their development and abilities and achievement of goals of the organisation.
Amstrong	Process of identification, development, recruitment, retention and deployment of talented people.
Lawler	Attraction of actual talents and helping them to understand the expectations about their work for the organisation. It is also providing them with development experiences that contribute to organisational strength and key competences, thanks to which it is possible to retain actual talents.
Cappelli	Process in which employees anticipate and fulfil their needs related to growth of human capital.
Davis	Talent management means recruitment and appropriate training and development of employees and also retention of the employees achieving excellent results. The strategy of talent management is a well-defined, structured approach of the organisation in terms of recruitment, retention of the employees and also training and development of skilled individuals in the organisation.
Blass	Additional processes of management and possibilities available to people that are talents in the organisation.
Silzer, Dowell	Integrated set of processes, programmes, cultural standards in the organisation that were created and implemented to attract, develop, build up talents with a view to achieving strategic goals and fulfil future business needs.

Source: Own study based on [2, 5, 7, 8, 12, 15, 27, 28, 34, 37].

Diversity and a high number of possible interpretations of talent management makes it very difficult to choose one definition as the most appropriate. It is more sensible to distinguish a few main perspectives, from which we can investigate talent management [5]:

- process perspective - in this perspective it is believed that future success of the organisation depends on having the right talents;
- cultural perspective - this perspective perceives talent management as an essential element to achieve success;
- competitive perspective - from this perspective talent management is to identify talents and to offer them better conditions than competitors;
- development perspective - according to this perspective talent management is a stepped-up career path for employees with high potential;
- HR planning perspective - means putting right people in right positions in a specific time;
- change management perspective - this perspective uses talent management as the element that stimulates changes.

Despite many debates on this topic, there has not been much attention paid to talent management in public sector so far [19, 26].

**Table 2: Talent management in medical entities in the world**

Country	Conclusions
United States	American medical schools devote time and resources to development of leaders- doctors. Talent management programs are a chance for the future of medical entities.
Great Britain	The research done in British hospitals shows that talent management is the key to improving the situation in health care.
Poland	The research on talent management in health care organisations are rare whereas demand for such research is enormous.
China	In China talent management in the global chain of values is undergoing development. The country wants to decrease shortages in the number of health care employees.
Pakistan	The research results suggest that medical entities have to devise appropriate practises in terms of management of talented workers. Such actions may help them achieve their desired objectives.
Slovakia	The key positions in many health care organisations are not held by persons with proper competences. Despite the growing popularity of talent management it is not a commonly used tool in Slovakian organisations.
Finland	The problems related to recruitment and retention of employees encourage medical entities to develop new recruitment and leadership as well as talent management practices.

Source: Own study based on [9, 18, 21, 24, 30, 31, 33].

Public healthcare as a part of economic environment is characterized by growing demand from customers and commonly understood and accepted mission. The result of activity of both public and private healthcare organisations is operation for the society as part of health improvement and lifesaving. In order to function healthcare organisations must operate according to the law. Realisation of the primary goal - to help people in need - and its own business needs as well is becoming very challenging for those institutions. Having an appropriate number of employees providing the highest quality care is a guarantee of success. To enable every member of staff to broaden their competences in terms of the latest trends contributes to the growth of healthcare entities. It was estimated that total labour expenses in this branch make up 60-70 % of the operational costs. It is and additional capital strain. The above mentioned conditions justify the need of effectiveness and productivity improvement of healthcare employees.

The total expenses on public healthcare in the main regions of the world till 2020 will stand at 8.7 billion USD, growing from 7 billion USD in 2015[16] (figure 1). The expenses presented in the first graph will be accelerated by development of the market, ageing of the society, technological progress, clinical development and increasing labour costs.

Figure 1: Health care spending 2015-2020
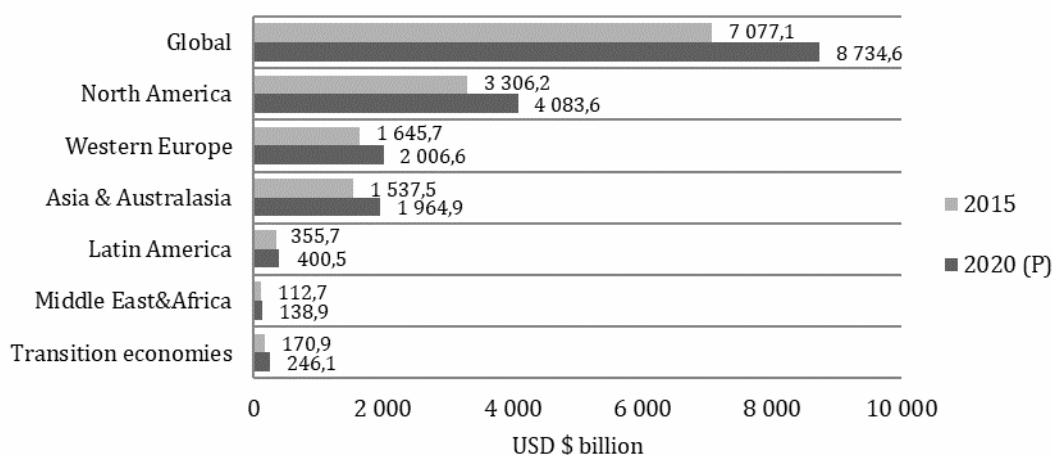
Source: Own study based on: [38].

Specialists in talent management in public healthcare sector believe that three main strategic goals should be pursued: cost reduction, improvement in patient satisfaction, improvement in patient safety [17].

Increased workload is an everyday reality for all employees in healthcare institution. Through the initiative of human resources related to the improvement in process efficiency and retention of employees, costs are reduced by these organisations. According to the research done by a leading supplier of software and advisory solutions in talent management in public healthcare entities - 74% of respondents are going to improve the processes in human resources management whereas 69% of respondents with a view to reducing costs are going to implement the initiative to retain employees [20]. Leave of a qualified employee equals approximately twice as much as the first-year salary of a newly employed one. A qualified employee provides the institution with previously acquired skills [22].

Respondents of the survey carried out in 2014 by a leading provider of software and advisory solutions in talent management in health care entities - Healthcare Source, need to deal with competitive initiatives (67%) and low budget initiative management (49%). Based on the opinion of 49% of respondents of that survey inappropriate technology is a very important problem as well. Specialists in human resources management in healthcare entities are aware of huge potential of the technology. The respondents have identified the technologies of effectiveness management (30%) and e-learning contents (25%) as factors improving the technology contributing to strategic achievements as far as talents are concerned. 'Human Resources management and education can see each other through a glass wall, but their actions are often not integrated'. The healthcare sector is constantly changing. The process results from the evolution of regulations, policy, care models and above all a growing demand for medical services. Based on the recent surveys [17], we can say that talent management specialists in healthcare organisations will always expect more for less. The annual analysis of the results Healthcare Source shows the main goal- providing services more effectively for the lowest possible costs. A consequence of this is a growing interest in automation of technological processes and reduction of manual labour strain.

With a view to recruiting talented employees to provide patient-oriented care healthcare institutions in rely on skills and sacrifices of the recruiters. They try to create a team that always attempts to provide the highest quality services. The key role belongs to doctors, nurses, medical assistants as well as the professional staff: receptionists, administrators and internship managers. Everyday work of staff varies from place to place, but the main task is invariable- to provide efficient functioning of a healthcare institution (e.g. hospitals). The persons having to do with administration may expect increase of employment by 23% until 2022 [6]. This result is much higher than national average for majority of professions in the USA. This growth reflects an increasing demand caused by ageing society and technological development, that contributes to the prolonged life expectancy. Such a health care system requires new hospitals, clinics and also a higher number of doctors and healthcare personnel as well as administrators. The USA expect an increase in employment in healthcare sector until 2026. Approximately 4 million new positions will be created, which stands for one third of overall employment increase [25].

My own empirical research was based on three semi-structured interviews, conducted in health care organizations in Poland in the Mazowieckie Voivodeship.

Public hospital A - The hospital determined the key positions in the organisation, however, the employees holding them can hardly ever be described as those attaining best results. The decisions regarding particular workers in the examined entity were largely made based on subjective opinions. Human resources management is affected by trade unions. The hospital is preparing the talent management program. The organisation reveals a need to conduct talent identification. The study proves that trainings should be classified among the activities undertaken for talent management.

Public hospital B - The talent management program is in its early development. The reason is relatively modest policy and practices in terms of human resources management. The organisation runs crippled talent identification and promotes persons achieving good results. The management believe that anyone to have revealed appropriate competences and

achievements in the past may be given a chance to take up a major position in the organisation. However, the key positions for the medical entity are determined for medical roles with administrative ones being overlooked. The results of the study show that talent management oriented activities are related to trainings, employee assessment and a number of internal recruitments. The talent management program in place enables improvement of employees' knowledge and skills. The trainings focus on the needs of the organisation whereas individual needs of particular workers are inferior to them.

Public hospital C - The hospital attempts to improve its human resources and talent management is perceived as going beyond.

Table 3: Talent management in Polish public medical entities

Organisation	Public hospital A	Public hospital B	Public hospital C
Advancement in talent management program	Under preparations	In force	Does not exist
Key positions	Doctors, nurses	Doctors, nurses, diagnosticians	Doctors
Talent management tools	Trainings	Trainings, system of employee assessments, internal recruitments	Do not exist
Objectives of an organisation regarding talent management program	Program implementation	Improvement in the practices run	Planning of a talent management program

Source: Author

The study conducted by myself reveals that inclusion of talent management in Polish public medical entities means that managements tend to perceive workers as similarly capable of holding key positions as well as equal chances for all the staff employed by the organisation. It is also worth noticing that trade unions in public medical entities are very effective in pushing their opinions regarding the issue of human resources management within organisation-based decisions.

4 Conclusion

To sum up, talent management in Polish public medical entities is at its early development stage. In the future talent management development is bound to vary depending on the financial capacity of such entities. In public organisations, trade unions will still have a tremendous impact on talent management. They will influence the ability of the management to take significant decisions in this respect. As far as the transfer of solutions between countries and organisations is concerned it is obvious that medical entities will adjust, the practices and policies created in other organisations for their own needs. In the future Polish medical entities should concentrate on identification of their own needs as employers. Healthcare sector units should realise to what degree talent management has an impact on employees' achievements and their retention. The key to a success for a medical entity is to retain the identified talents among their workers.

Talent management is one of the key challenges for organisations worldwide in a dynamic and volatile market environment requiring a response that is both quantitative (enough health professionals) and qualitative (with the adequate level of skills) [29].

Despite the many years of ongoing discussion, the issues of talent management in public healthcare organisations are still important and valid. Success in recruitment and retention of talented employees improves the position of a healthcare institution and contributes to the quality of the services provided. That translates to a high level of patient safety and their satisfaction as well as improves the organisation. Unfortunately, the limited size of this article does not enable presentation of equally interesting models of talent management.

One limitation of this article is the lack of intercultural research, which would relate to the issues connected with safety and health in the world and analysis of the main factors affecting qualified employees' decisions to move from developing to highly developed countries. This kind of research surely would strengthen the potential of the reflections that aim to boost the efforts to retain talents. Such actions would increase the stability of the global chain of values in the public healthcare. Nonetheless, it seems that this analysis may be a valuable voice in the discussion about talent management in public healthcare institutions, and the presented issues may be a starting point for both further research and implementation of practical solutions in the organisations.

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Use of Cost Effectiveness Analysis in Health Care. Towards Efficiency in Health care?

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Abstract

Cost-effectiveness (CEA) analysis is one of the measures how to inform decision-makers on the allocation of public resources. Though it was used when considering allocating resources in the public programs, it was later implemented in health care economics, and it has become a basic economic analysis when implementing economic analysis in the health care sector. The role and impact of CEA have its importance and is dealt with in the context of Healthcare resources. Our study aims at an examination of using the Cost-Effectiveness Analysis in health care. As a methodology, the literature review is used. The objective of our study is to overview the knowledge about CEA in health care, its suitability for the health care intervention evaluation and to find arguments, which contribute to the debate on cost-effectiveness (CE) thresholds. Our results show that the ICER should not be the single criterion for decision-making.

1 Introduction

No matter on the system of the financing what we can observe over the last decades is the rapidly rising health care costs. The share of health care expenditure in GDP rises rapidly in most countries in Europe. Technological Change on Health Care involving both diagnostics and treatment has been the driving force behind the rapid growth of health care expenditures [22]. This trend resulted in searching a concept, which balance the cost of care, and the quality of care, the aim of the concept is to compare alternative interventions and to assess the relative cost-effectiveness. CEA is the leader of economic analysis, the cost-effectiveness analysis (CEA). In this paper, we aim at the CEA, a concept that can help to make the public finance sustainable when concerning health care cost and is one of the key elements of Health Technology Assessment.

To bring this issue into a wider context, we should first answer the question, why public economists deal with Health care, its financing and further with improving efficiency. Malý shows the main sources of the inefficiency in the health care sector, the consequences of market failure, (well-known characteristics of healthcare markets, which was firstly described by Arrow, especially the externalities in health care market and asymmetric information) [1, 11]. The market failure approach to understanding the role of the government is largely a normative approach. Further Malý states the second source of inefficiency - state interventions. The realised amount of health care (services) is higher at a higher marginal cost than it would correspond to the market optimum [11].

The reviews of the literature are currently quite a standard tool of research, but not the reviews of research on Cost-effectiveness analysis in Health care. A literature review for using CEA in health care was performed quite a long time ago by Warner and Hutten in 1980 and by Klarman (1982) [10, 20]. To fill that gap in the literature, in this study we analysed published studies in the journal database, which address uses of the CEA. The purpose of our study is to investigate prior research in a field of CEA analysis, this approach is important as this reveals the current state of the knowledge and offers the guidance to researchers who are seeking this topic to explore (Karatas, 2008). More specifically, the following research questions (RQ) are addressed.

RQ1: What are the discussed strengths and weaknesses of CEA in the studies published?
RQ2: What type of thresholds is preferred and why?
The aim of our study is to identify in the literature strengths and weaknesses of CEA.

1.1 Background

The CEA is one of the basic economic analyses which may be part of the evaluation of new technology by pointing out the consequences of allocating resources to new programs (cure, health care intervention, ...). Even if the CEA was primarily used when considering allocating resources in the public programs later it was implemented in health care economics. The beginnings of CEA and concept of "threshold" was probably initially used by Weinstein and Zeckhauser in 1973 at first [21].

In the case of CEA, the health benefit can be defined and measured in natural units (e.g. years of life saved, deaths prevented, life-years gained and QALYs) and the costs are measured in money. It, therefore, compares therapies with qualitatively similar outcomes in a therapeutic area. CEA is the most commonly applied form of economic analysis in the literature, and especially pharmacy. The disadvantage of the cost effectiveness analysis is it that it does not allow comparisons between two different areas of medicine with different outcomes. Cost-effectiveness analysis (CEA).

The „incremental cost-effectiveness ratio (ICER)" is a statistic used in cost-effectiveness analysis to summarize the cost-effectiveness of a health care intervention. It is defined by the difference in cost between two possible interventions, divided by the difference in their effect. It represents the average incremental cost associated with 1 additional unit of the measure of effect. The ICER can be estimated as:

$$ICER = \frac{C_1 - C_0}{E_1 - E_0}$$

Where C_1 and E_1 are the cost and effect in the intervention group and where C_0 and E_0 are the cost and effect in the control care group. If we use a verbal formulation of the formula, we state that ICER is given by the difference in costs between two health care programs divided by the difference in outcomes between the programs

The aim of CEA´s is to improve the health of populations. CEA evaluates the costs and health effects of interventions and summarizes the results in cost-effectiveness ratios, for example, the cost per year of life gained. A general measure of health outcome, such as life-years or quality-adjusted life-years QALYs), makes it possible to compare very different health interventions [16, 19]. When we need to simplify the model so we can state that the CEA is concerned with health care intervention of program which requires a comparison of one intervention with an alternative method of dealing with the patients in a given health state. The alternative method may be some other treatment and we usually call it the comparator (it can be no treatment at all). It is very important to note that a cost-effectiveness analyse must state the two interventions that are being compared. The main results of a CEA – are cost–effectiveness ratios.

The CEA is not the only possible economic analysis in Health care, but it is the leader of them. Other analyses are Cost of Illness, Cost minimization, Cost Consequence and Cost-Utility and Cost utility analyses. Tab. 1 shows on the frequency of the individual economic method in academic publications, it summarizes the results of our investigation. ‚When searching the expression "Cost of Illness" (resp. "cost minimization analysis",) in column "title", "AND" was used in column "connector" a "health care" in column "topic". The searching was not limited by the year of publication output. The results show the CEA is by far the most numerously and it appears with nearly 5 times higher frequencies than CUA or CBA.

Table 1: Web of science, frequency of results to individual methods

Analysis type	Result
Cost of Illness	30
Cost Minimization	62
Cost-Effectiveness	1,109
Cost Consequence	38
Cost-Utility	256
Cost Benefit	215
Budget Impact	58

Source: Authors.

The number of CEAs in the literature continues to grow at an impressive rate e.g. [7, 21, 18]. But the question is, if these analyses are being performed properly with the aim to inform decision makers and which limits it brings with it. In our paper, we want to fulfil this research gap.

2   Material and Methods.

In review studies, various methods are used by researchers to select manuscripts. Examples include selecting from important journals within the field or selecting all articles published within the leading journals of the field (Karatas, 2008).

For this review, we selected scientific articles on the uses of CEA, published in journals that are indexed in the SSCI database. We employed this method because it is easy to access the field such as topic and research area (The Web of Science site WOS) was the point of access. In WOS, we used the advanced search function, and input the search terms "Cost effectiveness "and "health care ". We searched the expression "Cost effectiveness" in column "title", "AND" was used in column "connector" a "health care" in column "topic". The searching was not limited by the year of publication output. Moreover, the searching for scientific articles was performed in Databases J – stor and Google Scholar were used to identify the articles, the duplicities were excluded. Finally, we selected 11 articles for the purpose of our study.

As mentioned above the core of our research is based on literature review of literature sources. The methods of deduction and synthesis of acquired knowledge were used to identify research outcomes. The last part of this paper has normative character and contains recommendations for further research in this area.

3   Results and Discussion

O´Brien (1994) concentrated on the difference of two approaches to CEA, he reminds that uncertainty of the CEA arises because the true cost and effectiveness of an intervention are not known but estimated, where the estimations can be derived from direct measurement or indirect measurement which includes expert´s opinion. O'Brien's study is concentrated on the two approaches to CEA Analysis, in his study we do not find evidence on the debate on the CEA threshold [12].

According to Russell et all (1996), the cost-effectiveness analysis could be used in the development of medical and public health practice. The societal perspective is emphasised in the study. CEA analysis is understood as an aid to decision making which provides valuable. Information about health resources allocation. The study emphasises which health outcomes and costs are relevant and how they should be valued. Study pint out the principles which should be followed to a good solution (using Quality-adjusted life year - QALY weights from surveys is recommended). A note to this study is the fact that the study was not fully available and only abstract was assessed for our analysis [16].

Study		Research result
O'brien, (1994)	-	Two general approaches to CEA, the deter-ministic models and prospective stochastic analyses, no debate on decision making and CEA threshold
Russell et all (1996)	-	CEA does not reflect every element of importance in health care decisions but the information it provides is critical to informing decisions about the allocation of health care resources
Power, Eisenberg (1998)	-	Issue of "timing" of CEA is discussed (results for early stage of using medical technology and routine used later can differ substantially)
Eichler et all (2004)	-	CE thresholds are expected to emerge in many countries
	-	soft thresholds with upper and lower boundaries are prefer to rigid implementation of a single CE criterion
	-	transparency should be ensured
Donaldson (2002)	-	the economic evaluation may not give a clear-cut result
	-	the analysts should highlight the potential opportunity costs involved
Russell (2016)	-	the cooperation between the CEA analysts and decision maker is extremely needed to serve the needs of public health decision
Bertram (2016)	-	fixed cost–effectiveness threshold should never be used as a stand-alone criterion for decision-making.
	-	Cost-effectiveness ratios have useful informative value
	-	a broader context supported by legislation, stakeholder and patient's groups is needed.

Source: Authors.

Eisenberg and Power (2004) examine the issue of timing of CEA for new technologies and the issue if the CEA should be performed at the beginning of an intervention life cycle or later. The problem is that the results for the early stage of using medical technology would be much different than when the CEA is performed in a later life cycle of it when the intervention is a daily routine, daily used [7].

Eichler (2004) aims at the concept of a threshold, a ration between monetary costs (national currencies) and a measure of health gain. The decision rule than use a critical reaction as a constrained (ICER). By results, its study the thresholds should have a soft upper and lower boundary against the rigid implementation of singe CE criterion [5].

Donaldson´s (2002) study is one of those, which sounds more critic to CEA. The author points out to studies where not all factors have been taken in mind in CEA. Authors of the study examined articles in MEDLINE database and found that CEA is often misused especially in the sense of the calculating incremental cost-effectiveness ration. "We contend that, beyond the classic approach, many studies labelled as cost-effectiveness analyses of health care are not that at all. At best, this mislabelling is confusing: at worst, conclusions drawn by the studies' authors could be harmful to patients' health. Thus, there are contraindications to the use of cost-effectiveness analysis in health care, and an alternative economic approach is required." Authors recommend that the economic evaluations should pay more attention to implications for opportunity cost [4].

Russell (2016) emphasises that the solution must be developed out of a consensus among analysts and decision makers. The benefits and costs should always be presented in a disaggregated way so that decision-makers can clearly see the components [15].

Bertram (2016) evaluates CEA as a useful instrument for decision in health sectors, but he remains that more criteria than only CEA thresholds should be taken in mind, e.g. the health loss. The study points out that cost-effectiveness ratios should be informative but further, the

affordability and budget impact should be taken in mind when deciding on health care interventions which will be paid from public sources [3].

If we concentrate on the literature, where economic analysis, in general, are performed, and CEA is as part of it, we can furthermore identify the following issues, which we summarise in table 3.

Table 3: Authors and research founding

Study	Research result
Baltussen (2003)	- Problem obtaining the necessary data to carry out the economic evaluations is emphasized - The information which it provides are decisive in informing decisions about the allocation of health care resources
Ross (1995)	- The affecting the decisions made within the healthcare sector, the link between economic evaluation and health policymaking has been missing
Johannson (1991)	- From public choice perspective, the costs and benefits face the actual decision makers differs from the cost and benefits usually included in economic evaluations
Fiedberg (1999)	- Risk of bias analysis.

Source: Authors.

4 Conclusion

The CEA analysis the most popular approach and answer to the issue that medical research continues to produce an increasing number of innovations; however, budgetary constraint does not allow using all of them.

We concentrated on the literature, which proposes recommendations for the use of CEA and tried to identify strength and the weakness to consider more attention when the CEA analysis is performed or interpreted. From the practical issues we can highlight that more attention should be paid when the cost was estimated, the relevant health outcomes and cost should be considered and last but not least the problem obtaining the necessary data to carry out appear.

To the debate about the ICER, most of the authors agree, that ICER should not be the only criterion for the decision (or not a rigid ICER should be used, soft thresholds with upper and lower boundaries is preferred).

Some author criticises the CEA concept with the examination of performed studies. They show on the low quality of studies or biased CEA studies. As far as the critical remarks about the cost-effectiveness analysis, we point to the work of Donaldson [4].

Mentioned above show that undoubtedly the CEA should be an aid to decision making (and not only a domain of researchers – analyst), but the challenge to more transparency and consistency in the decision-making process arises. Moreover, some contradictory issues (should the ICER to be a rigid or soft boundary?) show that some issues of cost-effectiveness assessment remain the subject for debate and challenge for future research.

The opinion of the author reflects the fact that many factors influence the results of cost–effectiveness analyses (which data was used; which comparator was chosen). Then the variations in the inputs can cause, that the results of the analysis can significantly differ according to the choice of inputs. The analyses may not reflect the problem accurately, sufficient local capacity for the appraisal of economic models is needed and if the health system lacks it, the overreliance on cost-effectiveness ratios and a fixed threshold for decision-making may not be the right path and may result in the wrong decision being made.

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Comparison of Inequalities in Incomes in the European Union

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Abstract

The article deals with the analysis of income inequalities in the population of the EU Member States. However, this basic view is related to the methodological aspect for assessing the level of income inequality in these countries. The most general approaches and indicators are used for analysis (their relevance for analysis is not called into question). However, the article rather focuses on their appropriate grasp. For a more comprehensive analysis, the article used an analogy with a similar approach, which is used for assessing so-called convergence between the surveyed countries. The original concept of economic convergence is often extended to other areas. Therefore, it has been proposed to extend the standardization of the ranking of countries according to their inequality. The aim of this approach is to make easier the search for examples the good practices that EU Member States have already applied over the years to reduce the level of income inequality.

Keywords: inequality; redistribution of income; evaluation methods; indicators of income inequality

1 Introduction

The fundamental problem that economics solves is the issue of efficiency. To make this concept easier, the economists have developed the 3E concept (economy, effectiveness, efficiency). However, there is a widespread concept that, besides three basic economic concepts, still follows equity (see e.g. [3]). It is thanks to this element that we can leave a rating based on net performance and add it to the social point of view. However, this does not mean that the issue of equity is not directly related to the basic performance model. This article focuses primarily on the counterpart – i.e. the inequalities that will be related to the income of the population. Therefore, we will follow the basic redistribution problem, but it also has a strong relation to the issue of efficiency. The fundamental question of trying to achieve greater equity in the distribution of incomes in society can be linked to the assessment of how income distribution evolves over time. Whether we can see differences in income distribution between developed and less advanced economies where a higher inequality is generally expected (e.g. [2]). It is also a question of the appropriate setting of the tax-spending system, especially when it is necessary to consolidate public budgets (e.g. [6]). Dauderstädt and Keltek [9] mention the significant potential impact of the inequalities created on the European Union by the single market. Income inequality affects the purchasing power of the population.

The need to address inequalities is also underlined by the OECD institutions (see e.g. [15]), which perceive inequalities as a negative element because the mentioned inequalities not only reduce social confidence of institutions but also act as incentives for political and social instability. It can be the creating social barriers among groups or reducing social cohesion. It may also be an increase in the perception of injustice that arises from the unfair advantage of some individuals. Alternatively, the implications of a reduction in the willingness to share public goods can be mentioned, resulting in an overall reduction in social cohesion in society.

There are reasons for monitoring income inequality. The downstream issues are the question of measuring inequalities and finding ways to alleviate income inequality. The article aims to assess the level of inequalities across EU Member States and on the basis of the assessment of the results, to identify examples of good practice for tackling income inequalities.

Social policy issues are categorized among shared policies in terms of the division of competences between the EU and the Member States. Thus, the EU is in the Treaty on the Functioning of the EU (see Head X) as an institution which supports and supplements the actions of the Member States. On this basis, it seeks to promote the harmonization of social systems while respecting their diversity at Member State level. In the historical context, the wider attention is paid to social issues in the 1957 EEC Treaty (see Article 117). And although the need to address social issues arises, particularly in the context of the creation of a common market, the Single European Act (1987) leaves the concept of social policy to member states and only mentions the need to address social inequalities and take steps to improve the social situation in the EU. From the current point of view, it is necessary to mention, in particular, the Europe 2020 strategy, in which the attention is paid to social issues within the framework of so-called smart, sustainable and inclusive growth. At the same time, integration is understood as supporting the economy with high employment while preserving economic, social and territorial cohesion. In terms of social policy, efforts are made to reduce poverty and to increase the level of labor integration.

2 Material and Methods for Evaluation the Income Inequalities

The article focuses on comparing income inequalities in the EU Member States. The data for this comparison results from the Eurostat database. Specifically, the data that Eurostat receives through standardized EU-SILC (European Union Statistics on Living Conditions) measurement. This survey is standardized in all Member States, including other associated countries. The unified methodology thus enables to compare the economic and social conditions of households in individual countries (for more detailed see [8]). Conversely, data was not obtained from other databases because the other methodology used to collect it could distort the analysis outputs. Dauderstädt a Keltek [9] state that Eurostat data is obtained as a population weighted by national averages in relation to this database. This implicitly assumes that the poorest household group is essentially the sum of the poor in the respective quantile of all Member States while neglecting different levels of national income.

Assessment options include a range of approaches ranging from simple to fairly complex ones. Barr [4] states, for example, the goal is to create the indicator that evaluates the variance in income in a given population through one variable. The ideal is to set a value between zero and one, with zero being the most commonly reserved for the same income. Conversely, the result one is then related to situations of absolute distribution (the individual earns the income of the whole society). The evaluation itself is often based on two aspects:

- establishing a unit of equality or inequality of an individual, family or household,
- determining, which quantity the inequality will relate to (e.g. income, wealth, abilities, etc.).

The choice of the variant varies with the purpose of the analysis. The simplest approaches are based on the frequency distribution, which is determined on the basis of the amount of individual earnings within each level of the assessed incomes. From a mathematical point of view, we get a continuous function or a histogram. The advantage of using a continuous function is its simplicity and easy interpretation. Barr [4] draws attention to the fact that the simple interpretation applies especially to middle-income groups. On the contrary, the ability to report falls in the case of both extreme groups (the poorest or the richest), where distortion may occur.

The graphical apparatus for assessing inequalities is the Lorenz curve, which was explicitly designed to illustrate inequalities. The curve consists of points representing the cumulative share of income beneficiaries in the total number of beneficiaries and their share of total income. Absolute equality in the breakdown of incomes is expressed in the Lorenz curve with a curve with a 45 ° slope. The resulting income inequalities cause that the curve to moves away from this diagonal. And the distance between the straight-line distribution of income and the actual distribution represents the respective income inequality.

Atkinson [2] reminds that Lorenz's curve can help to compare two situations, for example, the distribution of incomes before and after taxation, when it can be concluded that the other of the curves is closer to the diagonal. Difficulties in comparison, however, occur if one of the curves compared crosses the second curve. In this case, it cannot be clearly stated which distribution of income is associated with a higher degree of inequalities. Thus, if a generalized conclusion cannot be drawn on the distribution of incomes among the population, the comparison of individual income groups is offered as a starting point (e.g. [4]).

However, if we want to compare more curves, small differences may not be apparent (see [13]). Therefore, for the comparison of individual curves, it is not possible to take advantage of the graphical apparatus. For this reason, Schutz [17] points out that the analysis should not focus on the curve, but rather it is the slope rating of the curve at each point. In this case, we can compare the curve directions that are the tangents of the curve at the relevant points. This gives us a more accurate picture of inequalities than can be deduced from the Lorenz curve itself. The curve directive at a given point can be obtained by the first derivative of the respective function. However, when using statistical data directly, it is more appropriate to use the form of:

$$k = \frac{\Delta y}{\Delta x} = \frac{PD_S}{PPD_S}$$

(1)

where: PD_S – the percentage of incomes received by the S group,

PPD_S – the percentage of recipients (i. e. group S).

When setting the appropriate values, the result can be interpreted in relation to the value one, which represents the value of the line on the main diagonal. The more the value deviates from one, the greater inequalities at that point we can reach. Calculated values for selected function points can be represented by the histogram of slopes (see Figure 1). On the x axis the percentage of recipients divided by individual decals is recorded. The y axis already shows the appropriate value of the directive. In the histogram of Figure 1, it is also clear that the D10-D40 recipients represent the poorest sections of the population. For comparisons, the value of the area under the curve of the even distribution of income, which also corresponds to the area above this curve, can be used. The richest part of the population obtains the loss of the poorest part of population. However, the number of population groups that can be classified as poor and the number of the richest population may differ.

Lapáček [13] reminds that the content of the histogram area can be calculated as:

$$O = \sum_{S=1}^{m} \left[\left(1 - \frac{PD_S}{PPD_S}\right) . PPD_S \right] = \sum_{S=1}^{m} (PPD_S - PD_S)$$

(2)

where: m – the number of groups for which the tangent line of the Lorenz curve is less than 1.

By measuring the income inequalities, the histogram area may be below 1, or the sum of the area contents above and below the x axis may be used (the same applies to the quality of the two areas). For detailed evaluations, you can also evaluate the areas of individual columns in each subgroup.

As another indicator, the so-called Income Quintile Share Ratio (S80S20) (used e. g. in OECD analyzes (see e.g. [15], [16]) is used for this indicator, which basically indicates the ratio of the income of 20% of people with the highest balanced income in society (we measure 5th quintile) to the volume of straight lines attributable to the 20% of the poorest households (i.e. 1st quintile. The value of the coefficient is in the range of values from one to infinitely. The increasing coefficient refers to income growth of the richest people, the more the value closes one, the more the income in the company will be flattened, the value 1 then refers to the absolute equality in the distribution of income in society.

The outputs of the calculated inequality coefficients (in particular, if output is one value expressing the state of inequalities in a given economy, it can be represented in graphical form, which will allow us to compare the situation in individual states (see, for example, frequent

outputs published in OECD publications - [15], [16]). The advantage of this approach is then the ease clarity or the possibility of creating a country's "ranking" according to the value of the indicator for the year under review. Year-on-year, a certain country's shift can be traced to this ranking, with ordinary information added directly to the value of the indicator. This makes it possible the individual countries to rank better.

The following chapter will use the above procedures to analyze the situation within EU Member States. The above outlined procedures will be used to analyze data from the Eurostat database. In terms of time series, the data will be examined in the 2005 to 2017 series. The start of the reference period can be combined with the largest EU enlargement so far (the fifth enlargement since the beginning of the Community). This way, the largest number of countries can be tracked in a long-time series. The analysis will gradually expand (as has been the case for further enlargements over the years) about Bulgaria, Romania and Croatia. The analysis will therefore respect the later accession of those countries.

3   Analysis of Inequalities within the EU Member States

The basis for assessing inequalities among the Member States is the graphical representation of the Lorenz curve. The development was monitored on the time series of 2005 (i.e. after the enlargement to Central and Eastern Europe) to the present (i.e. 2017). The aim was to capture the average change in income inequalities during the reference period. However, the low rate of change in income inequalities has made the changes in graphic expression hardly visible. For this reason, the histogram of slopes of tangents for Lorenz curves.

Thus, the population was divided into individual income groups according to the deciles (D1 to D10). The time span of 2005 to 2017 was also maintained. Only in view of the development of the macroeconomic situation was the situation observed in 2009 (see the global financial and economic crisis). This graph is shown in Figure 1

Figure 1: The histogram of slopes of tangents for Lorenz curves
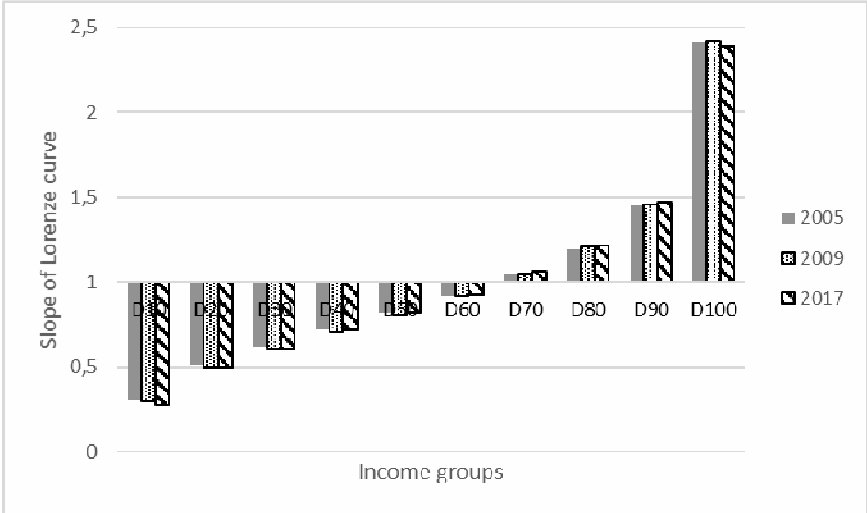
Source: Own calculation according to Eurostat.

We can see relatively small changes in Lorenz curves in Figure 1. These changes represent changes in the average level of inequalities within the EU Member States, can already be seen. Appropriate changes between the years under review are difficult to assess due to the low increments/decreases of displayed values. According to the basic rule, which says that with increasing deviation from one grows inequality at that point. And it is precisely this tendency that has been realized on average in the EU. We can say that the crisis in 2009 did not have a significant impact in terms of income inequality. If we calculate the area of the slopes now for the specific EU countries, we will find more fundamental changes in the inequalities concerning

only a limited number of countries. Alternatively, in ordinal expression, the order of the surveyed countries changes.

**Table 1: Evaluation of inequalities according to area size from the histogram – selected countries**

	2005		2009		2017	
Country	Value	Order	Value	Order	Value	Order
Sweden	0.162	1	0.18	6	0.193	9
Denmark	0.163	2	0.178	5	0.188	6
Slovenia	0.166	3	0.158	1	0.165	2
Slovakia	0.18	4	0.173	3	0.157	1
Finland	0.181	5	0.18	7	0.178	4
Germany	0.181	6	0.202	12	0.203	14
Czech Republic	0.182	7	0.174	4	0.172	3
Austria	0.182	8	0.19	10	0.193	8
Netherlands	0.184	9	0.187	9	0.188	7
Luxembourg	0.186	10	0.203	13	0.22	19
Hungary	0.19	11	0.172	2	0.196	10
France	0.194	12	0.207	16	0.201	11
Belgium	0.194	13	0.182	8	0.182	5

Source: Authors.

An overview of selected countries in Table 1 outlines the basic changes in income inequalities in selected EU countries. Here, the countries are arranged according to the size of the inequalities resulting from the size of the area that would be appropriate if the histogram was designed for each country in the respective years. For easier assessment, the ranking of the country in the relevant year is also given (the range includes all 28 EU Member States). The development between 2005 and 2017 shows that the size of inequalities is not dependent on the country's maturity. In many economically strong countries, inequalities have deepened over time (see, for example, the situation of Sweden, Luxembourg, Germany) or have decreased (see Belgium). Thus, we cannot immediately link the issue of inequalities to economic performance.

To complement the analysis of further evaluation through indicators, the benchmark is based on the Income Quintile Share Ratio (S80S20).

Figure 2: Increase and reduce inequalities between EU countries according to the S80S20 indicator
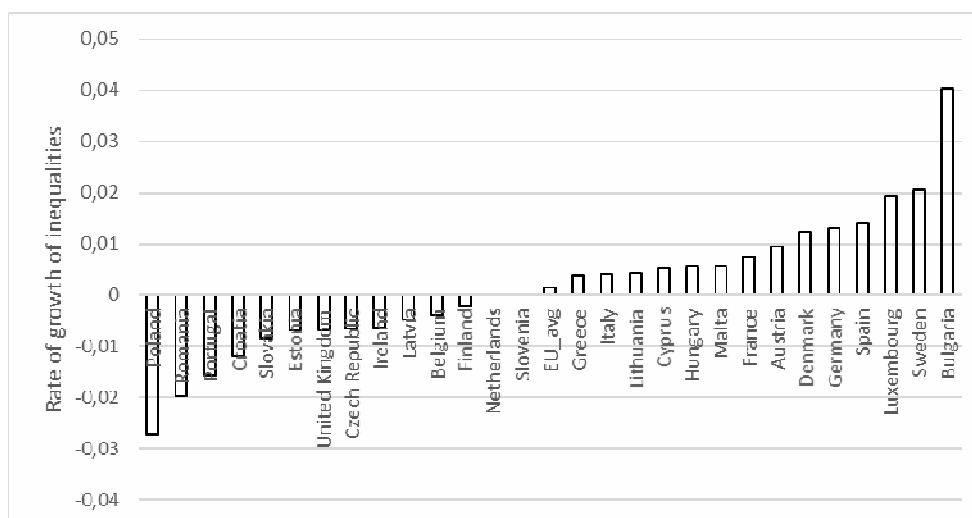
Source: Own calculation according to Eurostat.

The above analysis has now been expanded by another indicator. Its advantage is the use of one value to express the rate of inequality. However, Figure 2 shows an increase or decrease in the inequality gap between the endpoints of the period under review. Similarly to the existence of inequalities in the incomes of the population, dynamic changes can also be observed in these inequalities. Thus expressed changes in inequalities can help to find, for example, good practice in reducing inequalities. E. g. Poland and Romania experienced the largest decline in income inequalities. However, from the point of view of the overall view of the level of inequalities in these countries, a simplified assessment cannot be made because both countries showed high inequalities between population groups at the beginning of the period under review

In the introduction of the article, the link to public policies, in particular public finance, was mentioned. Continuity could be reflected, for example, through the impact of taxation or learning the amount of social security contributions on the one hand and the payment of social support, unemployment benefits and other social policy spending activities. First of all, the relationship between the above mentioned public finance measures and the development of income inequalities was examined. Thus, the Eurostat database included data for:

- public expenditure on social protection, expressed as a percentage of GDP,
- public expenditure on family and child benefits as a percentage of GDP;
- public unemployment benefits expressed as a percentage of GDP;
- taxes on individual or household income expressed in relation to GDP,
- total receipts from taxes and social contributions expressed in relation to GDP.

As a method of statistical analysis, a correlation was chosen which would demonstrate the degree of tightness of the dependence between the growth of the relevant public expenditure indicator between 2006 and 2016 and the rate of growth of inequalities in selected years. However, the correlation analysis carried out did not prove the reluctance between the above indicators and the increase or decrease in income inequality in society. This raises the question of whether to look for good practice examples within countries and their public policies. However, the above data selections are examined from a single point of view. For this reason, the following chapter outlines a possible procedure for assessing individual countries and their income inequalities.

4 Enhancement of Income Inequality Analysis

The above-mentioned assessment of inequality developments in publications is often based on country-to-country comparisons based on average gains or disparities in income inequalities among the population groups of the respective state. E.g. OECD analytical analyzes use a graphical representation based on the organization of countries according to the level of the relevant indicator, according to the amount of its change in a certain period. However, the question remains whether the use of "one dimension" of income inequalities is sufficient for, the evaluation of a successful one. E. g. the amount of decrease in the value of the relevant indicator over a certain period of time depends on the initial level of this indicator. For this reason, other options were sought to express the development of the income inequality situation. For this situation, the analogy method was used, where a similar "problem" solves the theory of convergence. This theory deals with the reduction of differences between two or more quantities over time. Authors [14] draw attention to the original concept of convergence (1980s and 1990s), which was derived only for the area of economic growth.

However, convergence as an indicator can be perceived in several forms: beta-convergence or sigma-convergence (see e.g. [1], [5]) or delta-convergence (see e.g. [7]).

In our case, we will use the beta-convergence approach, which evaluates not only the growth process in the relevant indicator but also refers to the initial value of the relevant indicator. Typically, it is recommended to perform the logarithm of the above values, thereby eliminating the asymmetric distribution and, as a rule, by approaching outlying values. From these variables, the geometric mean is determined according to the formula:

$$\log \bar{k} = \frac{1}{n}(\log y_n - \log y_0)$$

(3)

where: $\bar{k}$ - the average growth factor of the variable per unit of the time period under
review

y – a variable,

n – count of periods.

Part of the analysis is the construction of a graph where the x axis includes the values of log y_0 and the y axis corresponds to the values log $\bar{k}$. This concept will also be used to measure income inequalities. As a source of data, the above-mentioned indicator of income inequality has already served as a source of data. It was mainly used for its property meeting the above-mentioned requirement to express the inequality gap in the given territory through one value of the relevant indicator. For these countries and for the period under review, the necessary magnitude was calculated - the average change over the reference period, which supplemented the information on the initial value of the indicator. For Bulgaria, Romania and Croatia, the indicator was designed for EU membership. The results can be graphically represented by the graph in Figure 3.

Figure 3: Point graph for S80S20 for the period 2005 to 2017
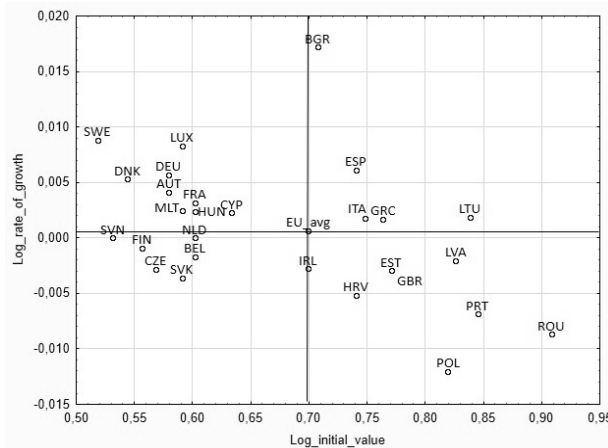
Source: Authors.

The value of the EU-average indicator helped us to divide the scoreboard into four quadrants. It can be said that the ideal values for the inequality area would be in the third quadrant. This means that the low level of initial inequalities is still accompanied by a gradual reduction of these inequalities (see, for example, Czech Republic, Slovakia, Belgium, and Finland). It is precisely this segment that we could use for international analysis and the search for "good practice" in finding ways to eliminate inequalities. On the contrary, the "most problematic" in this case is the first quadrant. The countries captured here not only reach high rates of income inequality, but also over time these equalities are deepening (see the countries of Bulgaria, Lithuania, Spain, Italy, and Greece).

In spite of its clarity and a more detailed understanding of the problem of the expression of income inequalities and their dynamics over time, this procedure also suffers from some distortions. The trend is expressed here by the initial and final state of the evaluated indicator. It is based on the fact that the individual year-on-year increases (decreases) are eliminated during the period under review and thus remain the main trend. It is precisely the potential fluctuations within the indicator within a given period to be crucial for the interpretation of development and appropriate measures to manage inequalities.

5 Conclusion

The aim of the article was to demonstrate various methods for determining the level of income inequalities on the example of EU Member States. The basic standard methods used for detecting inequalities can provide us a basic overview of the state or development of inequalities in individual countries. Especially the histogram of Lorenz curve guidelines and the income inequality indicator. In addition to the standard assessment of the development of inequalities across EU countries, the article also focused on the relationship among the development inequalities the EU Member States following the major enlargement to Central and Eastern Europe and indicators that reflect the trend in revenue and expenditure policies of public finances. However, carrying out a basic correlation analysis has not shown close dependence in these areas.

Another direction of work has already deviated from the traditional evaluation of inequalities. In particular, the beta-convergence approach was used. Compared to traditional methods for assessing income inequalities, we have thus been able to segment individual Member States in more detail. This more detailed classification could thus better serve to seek good practice in the approaches used by the state within the framework of public finances.

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Non-take-up Phenomenon in Conditions of the Czech Republic

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Abstract

The concept of a social state and its size differs from country to country and is influenced by characteristics such as its history, degree of solidarity and the mentality of its citizens which is manifested in their desires, etc. The main question remains of how extensive the social security system of the Czech Republic can afford to be under the condition that the state budget is balanced. In addition to the budget constraints placed on the system, some states are also struggling with a non-take-up phenomenon in the situation where an individual or household is entitled to assistance or social benefit under the legislation in force. In the Czech Republic, insufficient attention is paid to this problem, in spite of the fact that a high non-take-up rate can be a warning about problems in setting up or targeting the system. To identify the gravity of the problem, the authors employ micro-simulation modeling using data from the Czech EU-SILC survey from 2017. The paper is primarily focused on two specific types of benefits – the benefit package for senior citizens and the benefit package aimed at families with children. A part of the final discussion of the results will encompass methodological and data constraints and the risk groups threatened by the non-take-up phenomenon.

1   Introduction

Living standards and quality of life in modern society largely depend on the functioning of three institutions: the market (the labour market in particular), the welfare state (social policy) and the family [2]. The concept of a social state and its size differs from country to country and is influenced by characteristics such as its history, degree of solidarity and the mentality of its citizens which is manifested in their desires, etc. Social policy, as a part of public policy, is an integral part of a functioning society. It contributes to the reproduction of a developed society, mitigates poverty and unemployment, reduces marginalization of a larger part of the population, and promotes social integration. According to many previous studies i.e. [9] the most threatened risk groups of people are specifically senior citizens and families with children.

Social policy uses a variety of tools to address inequalities, both in income and material resources. Efforts to reduce disparities are linked to an important role of the state – the redistributive role. The state uses taxes and benefits to redistribute wealth towards low-income population groups and thus addresses the living conditions of individuals and households facing income and material difficulties. Social security benefits, as one of the most important tools of social policy, play an irreplaceable role in reducing poverty. In addition to the budget constraints placed on the system, some states are also struggling with a non-take-up phenomenon in the situation where an individual or a household is entitled to assistance or social benefit under the legislation in force, but these benefits are not drawn in reality for various reasons.

The problem of the non-take-up of welfare benefits has attracted relatively little attention in both academic research and policy analysis even in the Czech Republic [4]. The paucity of research on this issue stands in contrast with the evidence, reviewed in this paper, which shows that a significant number of people who could successfully claim welfare benefits do not apply for or receive them. Nevertheless a high non-take-up rate can be a warning about problems in setting up or targeting the system.

In the Czech Republic previous studies have varied greatly in quantifying the effect of this phenomenon. They range between 30-90 %, depending on the benefits system or the risk group definition [7]. In OECD countries the range is between 20-60 %. This wide range is caused by a variety of approaches, methodological differences, model limitations and unavailable data for individual countries. It is necessary to note that very few OECD countries were included in this study due to there being no available data for many of them. [4]

The aim of this paper is to identify the extent of the phenomenon of non-take-up of social benefits in the Czech Republic and the factors influencing this. The paper primarily focuses on two specific types of benefits – the benefit package for senior citizens and the benefit package aimed at families with children - with respect to the risk groups of people mentioned above. The first part of the article is purely theoretical. It explains the importance of the non-take-up phenomenon and its impact on effectiveness; it outlines possible reasons for this lack of use and explains the involvement and importance of different actors. The empirical part is based on the discovered level of non-take-up for the Czech Republic. The authors employ micro-simulation modeling using data from the Czech EU-SILC survey from 2017. A part of the final discussion of the results will encompass methodological and data constraints and the risk groups threatened by the non-take-up phenomenon.

1.1 Non-take-up as an effectiveness error

Nowadays, despite the important role of social policy, targeting benefits is subject to error. This failure has several reasons; nevertheless, the two main causes are errors occurring during the actual process of claiming benefit. Table 1 illustrates the consistency of policy targeting, entitlement and recipients of benefits. The first type of error is falsely claimed social security benefits illustrated as B+D. It takes the form of 'overpayment' of benefits to individuals who are not eligible for them and would have been identified as such had they disclosed all relevant information about their income and other details. On the other hand, social security benefits may not fully reach those eligible for them. This is the case of non-take up (illustrated as E), defined as the extent to which individuals fail to receive social security benefits for which are actually eligible [8]. Both of these errors limit the effectiveness of the social policy. Nevertheless, the fiscal effects of these errors are diametrically different: while 'overpayment' of benefit is costly to government finances, on the other hand non-take up saves public money. This asymmetry may partly explain why politicians place less emphasis on "non-take-up" than "overpayment".

Table 1: Consistency of policy targeting, entitlement and recipients of benefits

		Target household			
		Yes		No	
		Entitlement			
		Yes	No	Yes	No
Recipients of benefits	Yes	A	B	C	D
	No	**E**	F	G	H

Source: Authors based on [10].

As Mares [7] also emphasizes, critics of the welfare state point to the problem of abuse of the system by its clients, i.e. the drawing of social security benefits by persons who are not entitled to such. Social welfare advocates then focus on and point to the opposite problem – the problem of non-use of social security benefits by entitled persons. The description of possible combinations of policy targeting and its subsequent impact on households can be seen in Table 1. The consistency of the support and the recipient of the benefits are shown as option A. On the other hand, incorrect policy targeting is illustrated in situations E and F where F points

out that the entire target population is not captured due to an inappropriate support system setup, and E is a non-take-up situation.

Low rates of take-up of welfare benefits are a cause of concern for at least three reasons [4]. First, whatever the aim of a welfare program, the fact that it only reaches a fraction of those that are supposed to benefit reduces the chances that it will achieve its goals. The second reason for addressing the issue of low take-up of social benefits relates to equity. When the decision not to take up a benefit is partly involuntary (i.e. when individuals are simply unaware of being entitled, or feel stigmatized when receiving benefits), this generates disparities of treatment between individuals who should ex ante be treated equally by the welfare system. And finally, better understanding the determinants of take-up decisions by individual agents will allow more accurately anticipating the financial consequences of policy changes.

Based on Hernanz et al. [4] it is possible to distinguish four groups of determinants which set the extent of "non-take-up". (1) the expected level and duration of entitlement to benefit, (2) information costs, i.e. time and effort which is necessary for understanding the entitlement rules of social security benefits, (3) transaction costs associated with gathering proof of eligibility, administrative delays and error, and last, but not least (4) stigma as a psychological cost/barrier. Moffitt (1983) emphasized stigma as the main cost of participation in a means-tested program. Clearly, these factors interact with each other and at the same time the extent of "non-take-up" is influenced by three levels of actors - legislative, administrative and client. All these actors set social space in which a potential claimant makes a decision about claiming/not claiming the benefit [11]. Bruckmeier and Wiemers [1] examined, on the basis of regression analysis, the importance factors influencing the level of take-up. The regression results on the determinants of take-up reveal that the key-determinants of the take-up decision are the degree of need, measured as the benefit level households are entitled to, the number of young children in the household as well as the expected duration of receiving benefit. On the other hand they found that the stigma factor and information costs play a minor role in the take-up decision. Of course, these results depend on the level of the welfare state, social security system principles and culture disparities.

2 Methodology, data sources and limitations

To identify the gravity of the problem, the authors employ micro-simulation modeling using data from the Czech EU-SILC survey from 2017. Micro-simulation modelling is a tool for simulating the effects of a policy on a sample of economic agents (individual, households, firms) at an individual level. The usefulness of micro-simulation techniques in the analysis of public policies has two aspects. The first is the possibility of fully taking into account the heterogeneity of economic agents observed in a micro-dataset. The second is the possibility of accurately evaluating the aggregate financial cost/benefit of a reform.

The level of non-take-up is measured by two different indicators [11]. Caseload-based rate and expenditure-based rate. The first - the caseload-based rate is the most common indicator of the non-take-up level. It is defined as the number of entitled non-recipients divided by the total number of those eligible, whether receiving or not.

$$caseload\ based\ rate = \frac{\sum entitled\ non-recipients}{\sum number\ of\ eligible}$$

The indicator provides a rather pessimistic view regarding the inefficiency of the social security system. This is because it treats all claimants alike despite the fact that some of them give up only a small amount of benefits, and also because this measure does not take into account that non-recipients of benefits are on average entitled to a smaller amount of benefits than beneficiaries. Therefore, the analysis is complemented by the second indicator - the expenditure based rate takes into an account the size of unpaid benefits. It is defined as the amount of benefit not claimed by entitled non-recipients, divided by the total amount of benefit

available to eligible recipients, whether actually receiving or not. This indicator is mostly lower than the previous one because non-recipients can claim lower amounts of benefits on average than recipients.

$$expenditure\ based\ rate = \frac{\Sigma amount\ of\ benefits\ unpaid\ to\ entitled\ non-recipients}{\Sigma amount\ of\ benefits\ which\ should\ be\ paid}$$

The paper uses data from the sample survey EU-SILC which provides representative information on the income distribution of individual types of households, information on the type, quality and financial demands of housing, long-term household items, as well as working, material and health conditions of adults living in households. The Czech EU-SILC survey covers approximately 8,000 households annually, which means approximately 18,000 individuals living in the Czech Republic.

The EU-SILC data are based on a sample. Therefore, it can be expected that such a survey will not provide comprehensive information about all households in the Czech Republic (as is the case in the Population and Housing Census survey). Levy [6] points out that although the household survey sample may be representative of the overall population it is not necessarily representative of population sub-groups such as recipients of particular social security benefits. The disparity was greatest in the case of female pensioners aged 80 or over.

Because the survey is conducted with families living in standard forms of housing, the information on families living in lodging houses, homeless persons, persons using health care facilities for a short or longer period of time and persons serving a jail sentence is missing. Participation in the survey is voluntary; hence the results of the survey are influenced by the possible reluctance of a household to participate in the survey (the non-response phenomenon). This fact applies, to a greater extent, to households at both ends of the income spectrum.

Accurate computation of the non-take-up rate requires high-quality information on household income. The vast majority of datasets used for the estimation of take-up rates are based on self-reported information. The general problems related to the use of self-reported information are particularly relevant in studies of take-up behaviour [4]. It is known that respondents with lower income tend to overestimate their income and contrarily respondents with higher income tend to underestimate it [3].

There could also be a disparity between the date of the interview and the income reference period. In the case of the EU-SILC survey - respondents are asked to report on incomes earned up to 18 months before the day of the interview [8]. Data may also be inconsistent between status variables at the time of the survey and testing of these quantities in reality when requesting benefits. An example of these status variables can be the number and age of children, the type of housing, the number of people in the household, etc. The frequency of the survey does not correspond to the decisive period for the benefits, which is in reality shorter. However, for generalizing the entire population, we assume that the positive and negative deviations from the model interfere with each other.

However, despite the shortcomings and problems of the EU-SILC data, this data is the best data available for scientific and research purposes in the Czech Republic (EU-SILC data are also normally used for these types of analysis abroad).

3 Results and Discussion

The paper is primarily focused on two specific types of benefits – the benefit package for senior citizens and the benefit package aimed at families with children - with respect to the risk groups of people mentioned above. A major problem for these groups is housing costs. The state assists households in covering this expenditure, with a state social security benefit - Housing Allowance. This benefit is means-tested by assessing the income of all persons living together in the household (Act No. 117/1995).

The second selected benefit is Child Allowance which is only intended for families with children. In the Czech Republic, families are paid up to 2.4 times the subsistence minimum (the amount determined by the state depending on the number of persons and the age of the children in the family). It is therefore intended for low-income families with children. The amount of the benefit varies slightly according to the age of the child (CZK 500-700 per child per month, for comparison, the average wage was approximately CZK 30,000.00 and the minimum wage was CZK 11,000.00 in 2017).

Table 2: Recipients of Child Allowance and "non-take-up"

		Entitlement		
		Yes	No	Sum
Has the household in SILC2017 obtained Child Allowance?	Yes	86 562	129 594	216 157
	No	**58 431**	4 097 670	4 156 101
	Sum	144 993	4 227 264	4 372 257

Source: Authors based on Czech legislation and data from EU SILC 2017.

Table 2 shows that the entitlement to Child Allowance is met by only 3.32% of the total number of almost 4.3 million households in the Czech Republic. As was mentioned, this benefit is targeted only at poor households located in lower decile groups. The number of households that do not take up the benefit despite their entitlement is more than 58 thousand. The "non-take-up" rate based on the caseload-based indicator is 40.30% (the expenditure-based indicator is 39.04%).

Table 3: Recipients of Housing Allowance and "non-take-up"

		Entitlement		
		Yes	No	Sum
Has the household in SILC2017 obtained Housing Allowance?	Yes	177 417	17 297	194 714
	No	**892 062**	3 285 481	4 177 543
	Sum	1 069 479	3 302 779	4 372 257

Source: Authors based on Czech legislation and data from EU SILC 2017.

Housing Allowance is probably the most complicated benefit of the entire state social security system. The complexity of the benefit is evidenced by the high non-take-up rate associated with it [5]. The intricacy of Housing Allowance is also admitted by some officials responsible for the payment of the benefit.

Housing Allowance has a much wider impact than Child Allowance, from the definition of the target group, the entitlement to the benefit is 24.46 % (1 069 thousand) of the total number of households. The "non-take-up" for Housing Allowance according to the caseload-based indicator is 83.41 % (the expenditure-based indicator is 65.06 %).

In the Czech Republic, senior citizens represent a group that is increasingly becoming entitled to the benefit. The claim rate is 37.33 % of senior citizen households according to the SILC 2017 data. The non-take-up rate of this group is the highest of the monitored types of household; it reaches up to 92.02 % of eligible senior citizen households (similar non-take-up like [5]). A role in this may be played by low literacy levels, which is associated with senior citizens not using the Internet and other information means where they could find more information about the benefit. Another reason may be ambiguity and non-comprehension

regarding the entire benefit system. Households sometimes struggle to understand the law itself and often do not know how to find out if they are eligible to claim benefit.

These general results will be subjected to decompositions in follow up research. Households will be analyzed according to important factors based on foreign research (according to the type and size of the family, number of children, place of residence and type of housing, etc.). For the decision-making sphere, important information about changes in the non-take-up rate over a longer period would also be important. However, preliminary analyzes do not show a markedly downward trend.

4 Conclusion

The problem of the non-take-up of welfare benefits has attracted relatively little attention in both academic research and policy analysis. Low rates of take-up of welfare benefits should be a cause of concern for at least three reasons. First, whatever the aim of a welfare program, the fact that it only reaches a fraction of those that are supposed to benefit reduces the chances that it will achieve its goals. The second reason for addressing the issue of low take-up of social benefits relates to equity. When the decision not to take up a benefit is partly involuntary this will generate disparities of treatment between individuals who should ex ante be treated equally by the welfare system. And finally, better understanding of the determinants of take-up decisions by individual agents will allow more accurately anticipating the financial consequences of policy changes.

The non-take-up phenomenon can be influenced by three levels of actors and various factors affect it. The nature of potential claimants/recipients, information barriers and an ability to process information affect the non-take-up rate at client level. The administration of the whole social security system, setting conditions for eligibility and proper decisions of benefit specialists/administrators all have a relevant impact on the non-take up level.

Evidence about the level of non-take up of welfare benefits is very limited in most OECD countries. The United Kingdom seems to be the only country that, since 1997, regularly produced official estimates of take-up rates. Despite insufficient research in this field, previous research shows that the non-take up levels of welfare benefits are often high across many countries and programs. This is particularly the case for (means-tested) social assistance programs, where most estimates are in a range between 20% and 60% [4]. The results for the Czech Republic confirm the general trend where the expenditure-based indicator is lower. However, these higher results of non-take-up indicators (Child Allowance non-take-up 39 % and Housing Allowance 65 %) should be the first warning signal for the decision makers to undertake a deeper examination of setting benefits with regard to efficiency.

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Innovation Activities of Public Organizations in the Czech Republic between 2008 and 2014

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Abstract

The paper analyses innovation activities of public sector organizations between 2008 and 2014. This paper estimates the innovation process using three steps. In the first step, the probability to innovate is estimated. In the second step, the log of R&D expenditures per one employee is estimated. In the third step, innovation output is analyzed. Results suggest that size depends positively on the decision to innovate like in the case of private companies. The further market orientation contributes to the higher probability to innovate but not in the case of the public sector. Also, the probability to innovate in the public sector does not depend on the technology level, but it does in case of the knowledge level of the industry. The results, for the second step, suggest that the R&D expenditures do not negatively depend on the company size like in the case of private companies. The results, for the third step, suggest that the sales from innovating goods and services do not depend on the company size and the input/output ration is not statistically significant. The innovation behavior of enterprises in the public sector differs substantially.

1 Introduction

Innovation activities of public sector organizations (companies, institutes, and other organizations) are considered important for sustainable economic development. These organizations are mostly known for cooperation and facilitator of knowledge transfer (research institutions), but there are more types of public enterprises in the market. They are also "just" adapting to technological development and some are known for inefficient research and development (R&D) expenditures for large IS/ICT innovation projects. This paper analyses the innovation process of public sector organizations in the Czech economy between 2008 and 2014.

There are "hot topics" like the triple helix, SMART cities, and e-government in current research. All public sector organizations have to be prepared to new challenges which are buzzing in the European Union. The fourth industrial revolution is changing economies around the globe and demands qualified personnel. Public offices tend to have issues to understand what digital means and we speak only about the third industrial revolution here. For example, the only complex e-government solution was introduced by the government of Estonia. Even though there are some issues with e-Estonia it is nothing in comparison to other countries which are failing to introduce complex solutions and are still in the post-war age of "telephone and paper". The motivation of this paper is thus to discuss the similarities and differences between private and public sector organizations.

Because of SMART cities technologies, urban planning is a knowledge intensive activity of big cities' officials in the European Union. Public and private sectors together shape the environment and wellbeing of citizens. Finding the right regulatory policy for fourth and lurking fifth industrial revolution is a challenge. City officials are not ready for things to come. For example, in the case of shared mobility and driverless city technologies, city officials are solving problems ex-post and lacking engagement [15]. It is the same story all over again like in the case of UBER and Airbnb technologies which are not solved everywhere and seems irrelevant in

comparison. The solution is ready made and some cities are enhancing sustainability through sharing without problems [9].

Analysis of career satisfaction of professionals employed in various Commonwealth of Australia departments revealed that without a leader that actively shape the organizational culture no innovation will occur. The emphasis is on the presence of performance-oriented culture because that is the only way to support talent and a high degree of creativity [20]. Leadership Behaviour skills, organizational culture, and subsequent barriers are disused and analyzed in the public sector literature the most [18].

According to the economic theory [19], the problem is the natural occurrence of bureaucracy and low-cost benefit efficiency that is everywhere where the public budget is. This risk is also valid for public companies and R&D organizations. The motivations of stakeholders are skewed. The only motivation is power and budget inside the organization, not profit maximization because the competition is not present or able to wipe out inefficient market players [1].

But there are not only cities. What is the role of public sector innovation labs? These sector organizations also play a dominant role as a facilitator or carrier of technological growth. There are many types of public sector innovation labs (islands of experimentation, high-tech incubators, digital labs, etc.) and their existence raised many questions [16]. It is because public sector bureaucracies are resistant to change. The understanding of the matrix of stakeholders is crucial for successful innovation implementation within public sector organizations [10].

Should we compare public labs and private labs? According to economic theory public sector labs are inefficient in delivering consumer innovations, but in case of generic or basic research they role is important [6]. In the OECD countries, the share of public castor innovation expenditures is decreasing; more public sources are allocated as grants and (direct or indirect) subsidies to private companies. This trend can have adverse implications because of the positive externality attenuation [4]. The benefits of the triple (or quadruple) helix-based system can be endangered as well. Government organizations are able to nurture and centralize early stage niche innovation networks [8].

A systematic review of the literature on innovation in the public sector suggests the more theoretical background to address the issue of innovation antecedents, importance and market diffusion [11]. A good practice of public enterprises is to adopt market technologies and implement new-to-the-firm open innovation since there are mostly no competitive pressures or the issue is social driven [17]. Public enterprises should aim at innovations which deal with global issues like the reduction in greenhouse gas emissions [7]. In the case of hospitals, the public sector can even perform better than private enterprises like in Andalusia, Spain [13]. They can deal with agenda and innovation activities aimed at services that: "*promote democratic responsiveness, such as through active representation in public programs like small- and women-owned business programs that are designed to promote racial and gender equity in the federal procurement arena.*" [12, p. 187]

What makes public innovations more effective? The decentralization makes public enterprise or organizations a more flexible control system. This can promote strategic renewal and more ambitious innovation in the public sector [14]. An enterprise-level study of 86 Ecuadorian public companies found a positive elasticity (around 10 %) between R&D expenditures and sales [2]. Another Ecuadorian research found internal factors like workers training, external acquisition of knowledge in a firm level analysis [5].

2 Research questions and hypotheses

Current research aims at the role of the public sector and direct microeconomic studies are missing. This paper attempts to fill this gap by analyzing a panel of data which includes public companies and other organizations. The goal is to analyze the innovation process of public enterprises and other organization.

The value added is provided in the basic research question which aims at the comparison of results with the innovation process of private enterprises. The hypotheses deal with differences and characteristics of enterprises using 3 innovation stages. H1: In the first stage, the decision to introduce new-to-the-market innovation, the probability to innovate is lower for public enterprises in comparison to public enterprises. H2: In the first stage, the decision to introduce new-to-the-market innovation, the characteristics of public and private innovators differs. H3: In the second stage, R&D intensity, the intensity is lower for public enterprises in comparison to public enterprises. H4: In the second stage, R&D intensity, the characteristics of public and private innovators differs. H5: In the third stage, innovation output, the intensity is lower for public enterprises in comparison to public enterprises. H6: In the second stage, innovation output, the characteristics of public and private innovators differs.

3 Material and Methods

Four Community Innovation Surveys (CISs) datasets from 2008, 2010, 2012, and 2014 were coded into variables (Table 1). There are 22232 observations about firms in the Czech industry (NACE 3-digit range 101-829) and 791 public companies. Czech Statistical Office collects data every two years and it is mandatory to report innovation activities that influenced the enterprise in the last three years. The average number of employees is 193.37 but the variation is too high. The dataset includes only enterprises with 10 and more employees.

Table 1: Summary statistics of Czech manufacturing (NACE 101-332) innovation sample in 2010-2014

Variable	Obs.	Mean	Std. Dev.	Min	Max
Number of employees	22232	193.37	799.33	10	36332
Sales of goods and services	22232	9.37E+05	6.60E+06	2	3.62E+08
Total R&D expenditures	9169	3.31E+04	2.80E+05	0	1.51E+07
Foreign ownership	22232	31.23%	0.46	0	1
Share of new-to-the-market sales	22232	3.95%	0.13	0	1
New-to-the-market innovator	22232	18.61%	0.39	0	1
Technological level (3 = highest)	22232	0.54	0.85	0	3

Source: Authors.

Estimation method [3] uses natural logarithms for continuous numerical data. The procedure (Table 2) has three equations and comprises the term $Xn_{it}\beta_n's$ (with n = 1, 2, and 3) which expresses vectors of explanatory variables like number of employees, cooperation on innovation activities, etc.; the $\varepsilon_{\_itn}'s$ (with n = 1, 2, and 3) are random-error terms, the ρ_i denotes fixed effects.

The error terms are assumed to be independent of the exogenous variables. The bias from omitted variables is high given the nature of estimated data (innovation activities) and there is also slight endogeneity between financial variables. The first two error terms are estimated in the Heckman procedure to control for selection bias. Mills ratio is estimated for each period to account for selection bias. The vector of parameters to be estimated is denoted by β_n (with n = 1, 2, and 3) and the single parameters to be estimated are α in the last equation (innovation input-output elasticity).

Innovation decision (n_{it}^*) and R&D intensity (k_{it}^*)	$n_{it}^* = 1 \ if \ n_{it} = (X_{1it}\beta_1 + \rho_i + \varepsilon_{it}) > 0$ $n_{it}^* = 0 \ if \ (n_{it} \le 0)$ $k_{it}^* = \ln(k_{it}) \| (n_{it} > 0) = X_{2it}\beta_2 + \rho_i + \varepsilon_{it} \ with \ Df(k_{it}) = (0,\infty)$
Appropriability (t_{it}^*)	$t_{it}^* = \ln(t_{it}) \| (k_{it} > 0) = X_{3it}\beta_3 + \rho_i + \alpha k_{it}^* + \varepsilon_{it} \ with \ Df(t_{it}) = (0,\infty)$

Source: Authors.

The first innovation decision equation (r_{it}^*) accounts for selection into R&D activities, and it deals with the probability of an enterprise *i* to engage in R&D new-to-the-market activities in a year *t*. This is specified as a panel Probit model, i.e. $P(r_{it}^*>0) = \Phi(X_{1it}\beta_1)$, where r_{it}^* equals 1 if enterprise *i* is a new-to-the-market innovator. The second linear equation (k_i^*) describes R&D intensity (innovation input as the log of internal and external R&D expenditures to the number of employees in enterprise *i*). In all the equations, there is a number of potential determinants ($Xn_{it}\beta_n$'s) and some of them are used to identify each equation in a simultaneous estimation (i.e. market orientation, etc.). The third equation (t_{it}^*) models the innovation output as the log of sales of goods and services from the new-to-the-market innovated goods to the number of employees.

The robustness check was possible by including Mill's ratio (non-selection hazard) and to estimate more differences of the public and private sector, the dataset was split into two and results are available for all companies, public sector, and the private sector. This conference paper has limited space and no more robustness checks were implemented. Random effect models are checked by Sargan-Hansen statistics and reported in result tables.

4 Results and Discussion

Private companies engage less in new-to-the-market innovation activities in comparison to the default private sector company (not being part of a group, oriented at district markets, low-tech, low-knowledge-intensive and operated in the year 2008). The decision to innovate is in a positive relationship with the number of employees in all the sectors (Table 3).

Both cuts (private and public sets of the full sample) are comparable only to some extent. The estimation is the same but the number of observation is lower for the sample of public companies. The average private company is not being part of a group, oriented at local (district) markets, low-tech, and operated in the year 2008. Average public company with the same characteristics (not being part of a group, oriented at local (district) markets, low-tech, and operated in the year 2008) is fundamentally different, but the comparison of both samples will be done cautiously.

Being part of a group of companies is beneficial for the new-to-the-market innovation engagement in private but not in public sector. Further orientation is positive for both sectors but in the case of the public sector, the relationship ends at the national level. There are no differences between local, European and world market orientation in the private sector.

New-to-the-market Equation	(1) Innovation decision	(1a) Innovation decision	(1b) Innovation decision
Estimation method	Probit probability (Random effect)	Probit probability (Random effect)	Probit probability (Random effect)
Sample	All companies	Private sector	Public sector
Log of number of employees	0.239***	0.230***	0.364***
	(0.02)	(0.02)	(0.09)
Being part of a group	0.295***	0.313***	-0.095
	(0.04)	(0.04)	(0.25)
Public ownership	-0.262**		
	(0.12)		
Market orientation National	0.679***	0.676***	0.547**
	(0.05)	(0.05)	(0.26)
Market orientation Europe	0.583***	0.584***	0.000
	(0.06)	(0.06)	(0.51)
Market orientation World	0.960***	0.970***	-6.719
	(0.08)	(0.08)	(558.41)
Technological level Low-Medium Tech	0.159***	0.140**	0.847
	(0.06)	(0.06)	(0.53)
Technological level Medium Tech	0.434***	0.418***	1.248
	(0.06)	(0.06)	(0.87)
Technological level High Tech	0.700***	0.677***	8.921
	(0.10)	(0.10)	(1159.25)
Knowledge intensive service	-0.017	-0.047	0.782***
	(0.05)	(0.05)	(0.28)
The year 2010	-0.016	-0.011	-0.292
	(0.04)	(0.04)	(0.23)
The year 2012	-0.083**	-0.081**	-0.252
	(0.04)	(0.04)	(0.24)
The year 2014	-0.066*	-0.058	-0.469*
	(0.04)	(0.04)	(0.26)
Constant	-3.132***	-3.087***	-4.019***
	(0.09)	(0.09)	(0.58)
Panel variance	0.298***	0.300***	0.176
	(0.06)	(0.07)	(0.39)
Observations	22184	21395	789

Source: Authors.

Technological level plays a dominant role in the private sector and there is a strong positive relationship that grows gradually. In the public sector, we observed no relationship between technological levels but knowledge intensity is an important factor of new-to-the-market innovation-decision. Knowledge intensity in private sector is statistically not significant. The survey year 2012 that cover the period 2010-2012 was clearly affected by economic crisis and reported R&D expenditures were lower in comparison to survey the year 2008 or 2010. The private sector was affected in the period 2012-2014.

The R&D expenditures per employee are not dependent on public ownership (Table 4). They are in a negative relationship with the number of employees in the private sector and on average in all sectors, but not in the public sector. Being part of a group of companies is beneficial to R&D spending in the group of new-to-the-market innovators from the private sector but is not statistically significant for the sample of the public sector. There is a positive annual linear trend in the private sector and no trend in the public sector. The innovation sample in the public sector is very small and the only significant result is a negative relationship between high-tech level organizations and R&D expenditures per employee. Higher intensity is in lower-tech industries. The random effects allowed the assessment of public ownership but the overall explained variability is low.

Table 4: R&D expenditures per employee– all companies, private and public sector

New-to-the-market Equation	(2) R&D expenditures per employee (ln)	(2a) R&D expenditures per employee (ln)	(2b) R&D expenditures per employee (ln)	(2c) R&D expenditures per employee (ln)
Estimation method	Random effect (GLS)	Random effect (GLS)	Random effect (GLS)	Random effect (GLS)
Sample	All companies	All companies	Private sector	Public sector
Log of number of	-0.240***	-0.327***	-0.331***	-0.316
employees	(0.03)	(0.04)	(0.04)	(0.30)
Being part of a group	0.308***	0.209***	0.217***	-0.163
	(0.07)	(0.08)	(0.08)	(0.56)
Public ownership	0.156	0.204		
	(0.25)	(0.25)		
Technological level Low-Medium Tech	-0.051	-0.125	-0.142	0.714
	(0.09)	(0.09)	(0.09)	(0.71)
Technological level Medium Tech	0.330***	0.171*	0.157	0.984
	(0.09)	(0.10)	(0.10)	(0.76)
Technological level High Tech	0.490***	0.231	0.235	-2.538***
	(0.17)	(0.19)	(0.19)	(0.81)
Cross-sectional Mill's ratio		-0.655***	-0.682***	-0.534
		(0.20)	(0.21)	(1.33)
Linear trend	0.042***	0.037***	0.039***	-0.051
	(0.01)	(0.01)	(0.01)	(0.09)
Constant	-80.697***	-68.706***	-72.854***	109.105
	(25.05)	(25.36)	(25.64)	(185.17)
Sargan-Hansen stat.	8.31	10.88	13.67	7.95
Overall R²	3.5 %	3.9 %	3.82 %	7.67 %
Observations	3880	3880	3793	87

Source: Authors.

Sales of innovated goods and services per employee are estimated with fixed effects. The public ownership variable was omitted because it is a time-invariant feature (Table 5). A positive relationship is with cooperation partners in the public sector. Within information sources and university, cooperation was beneficial to innovation output. In the private sector, no cooperation was beneficial to the sales of innovated goods and services.

The analysis of sales of innovated goods and services shows a lot of statistically insignificant results. There are time-invariant characteristics of enterprises (fixed effects) that determine the ability to capture profits from new-to-the-market innovation activities. There is a positive relationship between the number of employees and innovation output in the private sector. An increase of 10 % in employee count contributes on average to the 6.9 % growth in sales of innovated goods and services. There is no such relationship in the public sector. The ability to capture profits is weaker (about 25 % lower sales) for multinational firms in the private sector in comparison to local owned new-to-the-market enterprises.

The latent R&D variable shows the potential innovation input-output ratio. It is statistically not significant in all samples. R&D expenditures (latent or real) are not multiplied and translated into sales of innovated goods and services. There is also no annual linear trend and no selection bias. The explained within variability is again low. Interestingly, there is no relationship between market orientation and innovation output in the sample of new-to-the-market innovators.

Most of the analyzed companies from the public sector come from industries like Production and distribution of heat and air conditioning, Water supply, Collection of waste, Passenger transport. Then there are a lot of companies throughout the NACE spectrum. New-to-the-market public sector innovators come from the industries: Collection of waste, Passenger transport, Repair of fabricated metal products, machinery and equipment, Technical testing and analysis, Research and experimental development, Wired telecommunications activities, Insurance, reinsurance, and pension funding, and Production, transmission and distribution of electricity. There are also "new-to-the-firm" innovators (total 123 observations in the sample) in the public sector but the majority is not innovators at all (668 observations).

Table 5: Sales of innovated goods and services per employee – all companies, private and public sector

New-to-the-market	(3)	(3a)	(3b)	(3c)
Equation	Sales of innovated goods and services per employee (ln)	Sales of innovated goods and services per employee (ln)	Sales of innovated goods and services per employee (ln)	Sales of innovated goods and services per employee (ln)
Estimation method	Fixed effects (OLS)	Fixed effects (OLS)	Fixed effects (OLS)	Fixed effects (OLS)
Sample	All companies	All companies	Private sector	Public sector
Log of number of employees	0.644***	0.915*	0.692***	1.453
	(0.14)	(0.47)	(0.13)	(2.10)
Being part of a group	0.053	-0.124	0.056	-0.268
	(0.15)	(0.32)	(0.15)	(1.08)
Foreign ownership	-0.288**	-0.291**	-0.273*	No observations
	(0.15)	(0.15)	(0.15)	
Latent R&D variable	-0.034	0.793	-0.039	-0.042
	(0.15)	(1.37)	(0.15)	(1.40)
Market orientation National	0.202	0.206	0.164	0.168
	(0.14)	(0.14)	(0.14)	(0.57)
Market orientation Europe	0.234	0.235	0.200	No observations
	(0.16)	(0.16)	(0.16)	
Market orientation World	0.225	0.234	0.188	No observations
	(0.20)	(0.20)	(0.19)	
Cooperation - group	0.108	0.106	0.073	3.900***
	(0.10)	(0.10)	(0.10)	(1.14)
Cooperation - suppliers	0.103	0.104	0.068	0.874
	(0.11)	(0.11)	(0.11)	(0.79)
Cooperation - private sector clients	0.014	0.018	-0.020	1.422**
	(0.10)	(0.10)	(0.11)	(0.71)
Cooperation - public sector clients	0.088	0.095	-0.017	1.192
	(0.21)	(0.21)	(0.21)	(1.40)
Cooperation - competitors	0.177	0.186	0.170	0.470
	(0.22)	(0.22)	(0.23)	(0.61)
Cooperation - labs	-0.143	-0.140	-0.176	No observations
	(0.18)	(0.18)	(0.18)	
Cooperation - universities	-0.100	-0.101	-0.151	2.201*
	(0.15)	(0.15)	(0.15)	(1.13)
Cooperation - private or public R&D organization	0.090	0.087	-0.104	4.798
	(0.34)	(0.33)	(0.32)	(4.49)
Linear trend	-0.010	-0.043	-0.009	0.059
	(0.01)	(0.06)	(0.01)	(0.13)
Cross-sectional Mill's ratio	Not included	0.589	Not included	Not included
		(0.96)		
Constant	26.685	87.747	24.514	-117.092
	(27.28)	(105.11)	(27.01)	(251.01)
Adjusted R² within	2.9 %	2.9 %	3.2 %	9.3 %
Observations	4127	4127	4034	93

Source: Authors.

5 Discussion

The results can be compared only to a few papers in the literature. Clearly, the link between R&D expenditures and innovation sales is more complex and not positive. In an OLS study with very limited control for selection bias or endogeneity, the positive link was found between R&D expenditures and sales [2]. Most of the companies (about 50 %) in the sample are dealing with some sort of distribution networks (water, heat, waste) and they deal with public goods and environmental issues. Their efficiency in comparison to private sector companies is limited and we can see that the adoption of technologies via cooperation seems to be a positive factor. This suggests a knowledge flows from the private sector to the public sector and certain adaptation to new technologies rather than new-to-the-market innovation as suggested by [17].

The main issue in the research design is a small sample size of public sector enterprises. Problematic is also the ommssion of some towns as major players in innovation activities because there are no sales of goods and services. Also, the estimation of the last step could not utilize random effect estimation procedure. Different techniques can be used which works with product and process innovation (or other ex-post measurable innovation outputs). Current CIS surveys are problematic and some variables cannot be provided or tested without indigeneity issues and biases (issues in hampering factors and the impossibility to estimate sales using capital, investment or material variables).

6 Conclusion

There are substantial differences between private sector and public sector new-to-the-market innovators. The probability to innovate is about 23 % lower in the public sector (H1 not rejected). Public sector enterprises form knowledge-intensive industries and national market competitors engage the most into new-to-the-market innovations. Private sector differs extensively (H2 not rejected). It benefits from being part of a group of companies; there is also a clear gradual positive relationship between further market orientation and technological level.

In terms of R&D expenditures, there are no statistically significant differences between average private and public new-to-the-market innovator (H3 rejected). High-tech public enterprises invest less in R&D in comparison to lower-tech public enterprises. Private sector again benefits from information sources and pressures of the group and there is a positive linear trend that suggests annual 3.9 % growth of R&D expenditures per employee in the private sector (H4 not rejected).

Innovation output is hard to measure. Sales of innovated goods and services per employee could be estimated only by using fixed effects. Sargan-Hansen statistics rejects the use of random effect estimation and the effect of public ownership in the whole sample of companies. Both groups were estimated independently. Innovation input-output elasticity (Latent R&D variable) was not significant for both groups (H5 rejected for fixed effects).

Surprisingly, cooperation partners are significant in the public sector (H6 not rejected). Within information sources and university, cooperation is beneficial to innovation output in the public sector. In the private sector, no cooperation was beneficial to the sales of innovated goods and services. There is no relationship between the number of employees and innovation output in the public sector. On the other hand, an increase of 10 % in employee count contributes on average to the 6.9 % growth in sales of innovated goods and services in the private sector.

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Public Funding of Business R&D Activities
in the Czech Manufacturing Sector 2010 − 2014

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Abstract

The analysis aims at the Czech manufacturing sector and innovation activities between 2010 and 2014. A panel of three Community Innovation Surveys is analyzed. This paper evaluates public funding of business R&D. The analyzed sample consists of 9316 observations of which 4313 are about R&D spenders, and 1942 are about new-to-the-market innovators. This paper estimates the model based on three stages of the innovation business process. The probability to innovate (full sample), the R&D expenditures per one employee and sales from innovated goods and services per one employee (new-to-the-market innovation sample) are analyzed. Central government funding and EU Programmes funding contributed to the innovation intensity (R&D expenditures). In the case of the innovation output, the additional contribution of public support was measured. Local and central government programmes, EU programmes, and also the variable describing support from the Framework/Horizon programmes were statistically insignificant. Public funding led to some extent to a crowding-effect of private sources in the manufacturing sector among new-to-the-market innovators.

1 Introduction

The public support of R&D activities of enterprises is based on the Kenneth Arrow's work [4] about market failures. The outcomes of innovation projects of enterprises are divided into private and public returns. The issues are (a) uncertainty especially in industries with rapid development and short-term profitability; (b) indivisibility or research and inappropriability of the profit stream. In other words, the outputs of innovation projects have partially nature of public goods. In theory, it is a good justification of public support. But there is no exact way to ex-ante measure the "extra" public/societal component of innovation projects.

There are many publicly funded support schemes for innovation at the firm level. Direct support is usually monetary (financing or co-financing for projects in the form of subsidies, grants, tax breaks, infrastructure etc.) or non-monetary (providing data, information, knowledge, requalification, incubators services, facilitating networking and coordinating collaboration etc.). The debate about public support of R&D is old and there is little consensus about the effectiveness of monetary and non-monetary publicly funded support schemes and about national innovation policies in general [2] [10].

National innovation systems include also directives and recommendation. Intellectual property rights (Patents, utility models, trademarks, copyrights, designs...) are rights given to persons over the creation of their mind. Their protection by governments is one of the most discussed issues in the field of law and economics [18] and the consensus is not being found [21] [20]. The green technologies (which might have the "extra" public component) are usually "pushed" and "pulled" by government regulation. But the subsequent public support of eco-innovation activities sometimes ignores the linkages between financial and other barriers (personnel, knowledge etc.) which hamper the potential of societal-sustainable R&D in industries [19].

Recent studies suggest a positive impact and argue that public support matters. Projects supported by the EU Framework Programme 1998-2002 contributed to higher labor productivity [3]. There was a positive impact of public support for innovation at the market level in Uruguayan firms [13]. Innovation vouchers that directly involve collaboration are beneficial for increasing senior manager openness to external knowledge and risk tolerance in U.K. firms [7]. The degree of formal protection of both product and process innovation is positively influenced by public support in the Dutch printing industry [17]. The great impact of public funding was observed in the Spanish food and beverage industry. National funds contributed to higher (54% more) R&D expenditures in comparison to firms without this type of public support [1].

The positive impact is one thing but it is expected because enterprises are given more money to R&D activities. The question is how effective is the money spent. In the last stage of innovation process [11] (implementation of method/commercialization), we can observe the ambiguity of the public support. There is negative additional contribution [8] [12], statistically not significant contribution [15] [16] of public support to innovation output (higher sales from innovated goods and services or probability of implanting product or process innovation).

There is a body of evidence that the crowding-out effect of private R&D is present and supported by over-reporting of R&D tax benefits especially in large enterprises [14]. The crowding-out of private investment is present in the sample of 29 European countries. The surveyed firms (70-200 respondents in each country) had at least 20 employees. The results suggest that public support (direct and indirect) relate to higher levels of engagement in open innovation but diminish in firms that are already innovative and support openness [6]. Public support for innovation tends to target already successful companies which intensify crowding-out effects. This distortion in market hinders competition and crowds out private funds was present in Russia in 2012 [22]. Similar results were found in Italy [5].

The goal of this paper is to analyze crowding-out effect in the Czech manufacturing industry and to assess public support efficiency in R&D intensity. This analysis is aimed at self-reported new-to-the-market innovators and their sales of goods and services from new-to-the-market innovated goods and services. The service sector was not analyzed because of estimation issues and given the different nature of service sector innovation [9].

2 Material and Methods

Three Community Innovation Surveys (CISs) datasets from 2010, 2012, and 2014 were coded into variables (Table 1). There are 9316 observations about firms in the manufacturing industry (NACE 3-digit range 101-332). Czech Statistical Office collects data every two years and it is mandatory. The average number of employees is 196.61 but the variation is too high. The dataset covers only enterprises with 10 and more employees. The dynamic component of microenterprises is missing. Estimation method uses natural logarithms for continuous numerical data like a number of employees or sales.

The share of multinationals is quite high in the Czech economy. The sample has 31.85 % foreign owned (50 % and higher ownership) enterprises. The average technological level is "Low-Medium Tech" enterprise, but again the variation coefficient is almost 100 %. There are 4313 innovators but only 2019 of them were new-to-the-market innovators, the rest "imitated" the competition and introduced "innovation" that was already in the market, but new to the enterprise. There are four public support variables divided by the provider. The market orientation variable ranges from a local market (small district) to world markets (the USA and China). The interpretation of results is at 5 % alfa and the standard errors reported in brackets below the regression coefficient are robust to heteroscedasticity.

Table 1: Summary statistics of Czech manufacturing (NACE 101-332) innovation sample in 2010-2014

Variable	Obs.	Mean	Std. Dev.	Min	Max
Number of employees	9316	196.61	574.08	10	24509
Sales of goods and services	9316	8.44E+05	5.96E+06	24	2.97E+08
Total R&D expenditures	4313	40820.66	372259	0	1.51e+07
Foreign ownership	9316	31.85%	0.47	0	1
Share of new-to-the-market sales	9316	4.19%	0.13	0	1
Public support: Local government	9316	2.03%	0.14	0	1
Public support: Central government	9316	12.15%	0.33	0	1
Public support: EU funds	9316	11.01%	0.31	0	1
Public support: Horizon or Framework Programme	9316	7.12%	0.26	0	1
New-to-the-market innovator	9316	21.68%	0.41	0	1
New-to-the-firm innovator	9316	28.96%	0.45	0	1
Technological level (3 = highest)	9316	0.96	0.94	0	3
0: Low-tech	3,842	41.24 %			
1: Low-to-medium	2,525	27.1 %			
2: Medium	2,436	26.15 %			
3: High-tech	513	5.51 %			

Source: Authors.

The estimation procedure of the innovation process in manufacturing companies (Table 2) comprise the term $Xn_{it}\beta_n's$ (with n = 1, 2, and 3) which expresses vectors of explanatory variables like number of employees, public support variables etc.; the $\varepsilon\_{itn}'s$ (with n = 1, 2, and 3) are random-error terms, the ρ_i denotes fixed effects.

The error terms are assumed to be independent of the exogenous variables, but there is a bias from omitted variables and also slight endogeneity between financial variables. The first two error terms are estimated as a system (Heckman procedure), to control for selection bias. Mills ratio is estimated for each period and was always significant which suggests selection bias. The vector of parameters to be estimated is denoted by β_n (with n = 1, 2, and 3) and the single parameters to be estimated are α in the last equation (innovation input-output elasticity).

Table 2: Innovation process estimation procedure

Innovation decision (n_{it}^*) and R&D intensity (k_{it}^*)	$n_{it}^* = 1 \ if \ n_{it} = (X_{1it}\beta_1 + \rho_i + \varepsilon_{it.}) > 0$ $n_{it}^* = 0 \ if \ (n_{it} \leq 0)$ $k_{it}^* = \ln(k_{it})|(n_{it} > 0) = X_{2it}\beta_2 + \rho_i + \varepsilon_{it.} \ with \ Df(k_{it}) = (0,\infty)$
Appropriability (t_{it}^*)	$t_{it}^* = \ln(\tau_{it})|(k_{it} > 0) = X_{3it}\beta_4 + \rho_i + \alpha k_{it}^* + \varepsilon_{it.} \ with \ Df(\tau_{it}) = (0,\infty)$

Source: Authors.

The first innovation decision equation (r_{it}^*) accounts for selection into R&D activities, and it deals with the probability of an enterprise *i* to engage in R&D new-to-the-market activities in a year *t*. This is specified as a panel Probit model, i.e. $P(r_{it}^* > 0) = \Phi(X_{1it}\beta_1)$, where r_{it}^* equals 1 if enterprise *i* is a new-to-the-market innovator.

The second linear equation (k_i^*) describes R&D intensity (innovation input as the log of internal and external R&D expenditures to the number of employees in enterprise i). In all the equations, there is a number of potential determinants ($Xn_{it}\beta_n$'s) and some of them are used to identify each equation in a simultaneous estimation (i.e. hampering factors, market orientation etc.).

The third equation (ti_t^*) models the innovation output as the log of sales of goods and services from the new-to-the-market innovated goods to the number of employees. The aim is to estimate the input-output elasticity (α) and the additional effect of public support. The fourth linear equation usually describes labor productivity, but due to the Czech Statistical Office data restrictions, it is not employed.

3 Results and Discussion

Innovation decision (Table 3, model 1) regarding new-to-the-market innovation is in a positive relationship with enterprise size, being part of the group and in a negative relationship with foreign-owned companies. There are control variables and their effect is described in Table 4. This first step selects new-to-the-markets innovators in the innovation process that successfully ended with new-to-the-market innovation.

Table 3: Innovation process: Innovation decision and R&D expenditures per employee

New-to-the-market innovation activities	(1) Innovation decision	(2a) R&D expenditures per employee (ln)	(2b) R&D expenditures per employee (ln)	(2c) R&D expenditures per employee (ln)
Decision to innovate and R&D intensity	Probit probability	Random effect (GLS)	Random effect (GLS)	Random effect (GLS)
Log of number of employees	0.388***	-0.243***	-0.487***	-0.513***
	(0.03)	(0.04)	(0.07)	(0.07)
Being part of a group	0.320***	0.310***	0.071	-0.054
	(0.08)	(0.12)	(0.13)	(0.13)
Foreign owned	-0.436***	0.428***	0.665***	0.598***
	(0.08)	(0.11)	(0.13)	(0.13)
Funding – Local government		0.312*	0.309*	0.291*
		(0.16)	(0.16)	(0.16)
Funding – Central government		0.827***	0.803***	0.748***
		(0.09)	(0.09)	(0.10)
Funding – EU funds		0.716***	0.693***	0.646***
		(0.14)	(0.14)	(0.14)
Funding – EU Framework Programme or Horizon		0.049	0.055	0.038
		(0.15)	(0.15)	(0.16)
Linear trend		0.041*	0.042*	0.050**
		(0.02)	(0.02)	(0.02)
Coooperation partners	No	No	No	Yes
Market orientation	Yes	No	No	No
Technological level	Yes	No	No	No
Year dummy	Yes	No	No	No
Cross-sectional Mill's ratio	Not applicable	No	-1.336***	-1.332***
			(0.33)	(0.32)
Constant	-3.677***	-79.532*	-78.261	-93.862*
	(0.16)	(48.18)	(48.12)	(50.15)
Observations	9213	1942	1938	1938
Overall R^2	Not applicable	11.4 %	12.1 %	13.6 %
Sargan-Hansen statistic	Not applicable	13.62	12.68	26.67

Source: Authors.

The selection bias given by Mill's ratio (see Heckman procedure) is evident in each period and influenced the interpretation of the results of R&D intensity. The intensity measured by the logarithm of R&D expenditures per one employee is in a negative relationship with enterprise size in all the models (Table 3, model 2a, model 2b, and model 2c) and in a positive relationship

with the foreign ownership of the enterprise. Being part of the group is not statistically significant in all cases and did not survive the robustness check procedure.

At 5 % level alfa, two funding variables (local government, Framework Programmes, and Horizon funds) are not significant. But results suggest that there is a positive relationship between R&D expenditures per one employee and funding by local government (10 % level alfa), central government, and European Union funds. These results survived a robustness check procedure.

Table 4: Innovation process: Innovation decision – control variables

New-to-the-market innovation activities	(1) Innovation decision Probit probability
Market orientation National	0.716*** (0.08)
Market orientation Europe	0.592*** (0.09)
Market orientation World	0.921*** (0.12)
Technological level Low-Medium Tech	0.072 (0.07)
Technological level Medium Tech	0.307*** (0.08)
Technological level High Tech	0.664*** (0.13)
The year 2012	-0.104** (0.05)
The year 2014	-0.048 (0.05)
Panel-level variance constant	0.524*** (0.10)

Source: Authors.

Table 5: Innovation process: R&D expenditures and sales of innovated goods and services per employee - control variables

New-to-the-market innovation activities	(2c) R&D expenditures per employee (ln) Random effect	(3b) Sales of innovated goods and services per employee (ln) Fixed effects (OLS)
Cooperation - group	0.748*** (0.14)	0.126 (0.15)
Cooperation - suppliers	0.526*** (0.13)	0.073 (0.17)
Cooperation - private sector clients	0.494*** (0.12)	0.011 (0.15)
Cooperation - public sector clients	0.295 (0.35)	-0.028 (0.40)
Cooperation - competitors	0.333 (0.26)	0.495 (0.38)
Cooperation - labs	0.457** (0.22)	-0.411 (0.29)
Cooperation - universities	0.268 (0.18)	-0.214 (0.18)
Cooperation - private or public R&D organization	0.136 (0.27)	-0.107 (0.34)

Source: Authors.

Innovation decision that ends with a new-to-the-market innovation depends on market orientation (Table 4). The relationship is positive for all the markets. Interestingly, European markets orientation contributes less to R&D intensity than national market orientation. Medium-tech and high-tech industries spend more on R&D than low and low-medium-tech industries. Also, the probability to introduce new-to-the-market innovation was about 10 % lower in the period 2009-2012.

Cooperation brought positive effects to R&D expenditures per employee (Table 5). The best contributors were the companies inside the group, suppliers, labs, and clients from the private sector. There is no contribution to R&D intensity of universities or public sector clients. In the case of innovation output, there is no additional effect of all cooperation partners.

Table 6: Innovation process: sales of innovated goods and services per employee - control variables

New-to-the-market innovation activities	(3a) Sales of innovated goods and Services per employee (ln) Fixed effects (OLS)	(3b) Sales of innovated goods and Services per employee (ln) Fixed effects (OLS)
Log of number of employees	0.556*	0.576*
	(0.33)	(0.33)
Being part of a group	0.174	0.207
	(0.32)	(0.32)
Foreign owned	-0.050	-0.011
	(0.36)	(0.36)
Funding – Local government	0.350	0.389
	(0.28)	(0.29)
Funding – Central government	0.062	0.102
	(0.57)	(0.58)
Funding – EU funds	0.339	0.339
	(0.51)	(0.52)
Funding – EU Framework Programme or Horizon	-0.056	-0.032
	(0.16)	(0.16)
Linear trend	0.061*	0.064*
	(0.04)	(0.04)
Market orientation National	0.209	0.202
	(0.48)	(0.49)
Market orientation Europe	0.045	0.032
	(0.45)	(0.46)
Market orientation World	0.044	0.043
	(0.63)	(0.64)
Latent R&D intensity	-0.031	-0.020
	(0.03)	(0.03)
Cooperation partners	No	Yes
Constant	-114.226*	-119.085*
	(69.17)	(71.38)
Observations	1937	1937
Adjusted R2	5.1 %	6.7 %

Source: Authors.

Sales of innovated goods and services per employee (Table 6) are not in any relationship with all the variables at 5 % level alfa. We observe positive trend and relationship between size and Sales of innovated goods and services per employee. The results are expected because there is a high degree of heterogeneity of firms and the estimation only allows for within variation. We were unable to estimate the random effect model more variables are needed or different estimation approach.

Results suggest there is no additional effect of public support on innovation output measured by sales of innovated goods and services per employee. The sample consists of new-to-the-market innovators and their time-invariant characteristics (fixed effects) define their innovation output and the ability to capture profits.

4   Conclusion

Czech manufacturing sector R&D activities of new-to-the-market innovators were influenced by public sources. This support did not contribute to higher R&D expenditures in all types of support and there was no additional effect of all the sources on sales of innovated goods and services. Public funding led to some extent to a crowding-effect of private sources.

The sample of 9316 observations about enterprises received support from local government, central government, EU funds, and Framework Programme/Horizon2020 funds. Three-stage model of the innovation process was used and three dependent variables analyzed: The probability to innovate, the R&D expenditures per one employee and sales from innovated goods and services per one employee.

Result suggests that national and EU funds contribute to higher R&D expenditures in comparison to unsupported firms. But the effect ends there. There is no additional effect on innovation output. There are two possible channels and both are not statistically significant. First, the input/output innovation elasticity ratio (more R&D produce more sales of innovated goods and services) is not statistically significant for new-to-the-market innovators. Secondly, public support sources have no additional effect on sales of innovated goods and services.

The ability to capture profits from innovated goods and services depends on time-invariant characteristics of firms. The last stage that describes commercialization is the very problematic and random effect is usually hard to estimate. Future research can incorporate easier method like bivariate Probit for the product (goods and services) and process (new methods) innovations.

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Paradigm Reform for the Czech Family Benefits and Credits

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Abstract

While many authors focus on the submission of partial improvements of the Czech family policy, insufficient attention has been devoted to the family policy system as a whole. In the Czech political scene, there is an increasing tendency towards simple political marketing. However, social policy theory should focus on analysing family policy, particularly via the application of (liberal, Christian-democratic, social-democratic and neoliberal) welfare regimes. The optimal approach for individual countries is to focus on one of these models, thus allowing for the reaping of the various synergy benefits of the application of one coherent model. From this point of view, the Czech socio-economic system is based on somewhat unstable foundations, in comparison e.g. to Germany or Sweden. The paper focuses on Czech family benefits and credits and on their restructuring via the application of OECD and EU recommendations.

Keywords: child benefit ; child tax credit; parental benefit ; welfare regime ; full-day preschool

JEL Classification: H24; H53; J13

1 Introduction

The OECD has repeatedly recommended that the duration of the parental allowance in Czechia be shortened, and funds saved be transferred to the provision of childcare services for families with small children. The approach of the EU is similar in this respect: „The labour market participation of women with young children is hampered by a persistent lack of affordable and quality childcare services, in particular for children up to 3 years old, by long parental leave entitlements." [2]. The OECD miscalculates the Czech full-rate equivalent of the parental benefits in Czechia and we revise these data in this paper.

Figure 1: Typology of basic social models of family policy
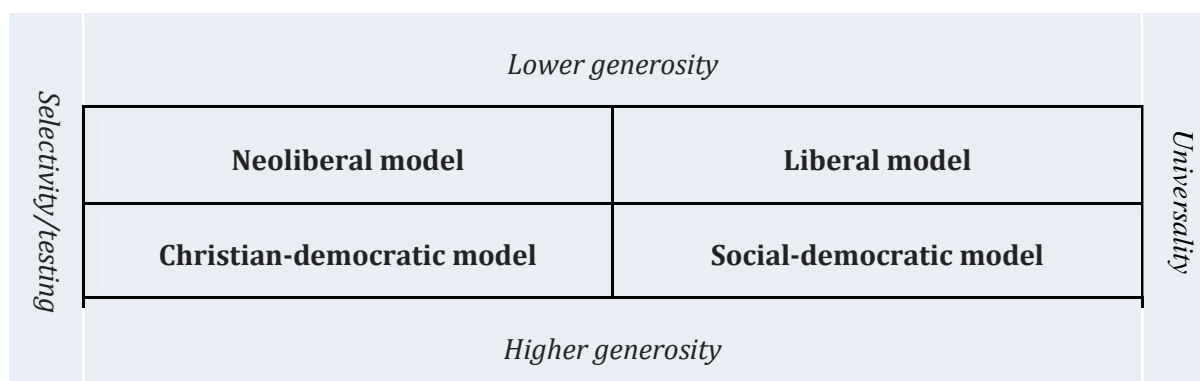
Source: Author.

It is possible to trace several typical, basic social models or welfare regimes as defined by Esping-Andersen [3]. We distinguish the liberal, Christian-democratic and social-democratic social models as well as the neoliberal model that has developed since the 1990s. The main differences between these four basic social models of family policy can be schematically depicted via differences in, on the one hand, an emphasis on universality or the selectivity and, on the other, the lower and higher generosity of the family policy – see Figure 1. The aim of this

paper is to compare the four basic models and, on this basis, to analyse the most efficient prospective reforms of the Czech family benefits and credits.

2 Material and Methods

The **modern liberal social model** entails the relatively low universal family benefits, as e.g. designed by the UK Beveridge Commission in 1942 and introduced by the Labour government after the Second World War. The child benefit was intended to cover the child's subsistence minimum. The UK government introduced the Family Allowance, commencing with the second child in the family. In 1977, this allowance was replaced by the Child Benefit paid for the first child at the level of 5% of average net earnings. Since 2013, the child benefit has not constituted a (fully) universal allowance due to the introduction of the High Income Child Benefit Charge, which affects around 1% of children. In the last few years, child benefits have been provided in the amount of £20.30 per week for the oldest child and £13.40 per week for the other children.

In the beginning of the 2000s, some neoliberal concepts were realized in the UK aimed at working families with children. In 2003 the Child Tax Credit (CTC) was introduced, significantly affecting the overall state support system for families with children; in 2005 the CTC for a family with two children aged 2 and 7 and one breadwinner with national average earnings (NAE) amounted to roughly the same as the universal child benefit; moreover, it was significantly higher than in the majority of other comparable countries [4]. Since 2016, the CTC was incorporated as a "child element" into the new Universal Credit (UC), a social assistance benefit for those of active age towards which the UK is gradually moving – by region – up to the deadline of 2022. The reform is linked to an extensive restriction in paid benefits.

The Beveridge liberal maternity benefits model was based on the ruling male breadwinner model at that time. The National Insurance Act of 1946 introduced (also) a universal Maternity Grant of £4, intended to subsidise maternity costs; the rest of the costs were expected to be borne by the breadwinner. The universal Maternity Allowance (MA) of 36 shillings weekly was designed to supplement the Maternity Grant for married working women for a period of 13 weeks, provided they gave up working. MA was intended to make it easier and more attractive for women to leave their job.

Today, the Sure Start Maternity Grant in England of £500 is provided only for the first child and for recipients of means-tested benefits only. The Scottish Pregnancy and Baby Payment is more generous: £600 is paid for the first child and £300 for further children. The means-testing of birth grants is typical for the neoliberal social model.

The current maternity benefit was introduced by the Labour government in 2003; it is paid for up to 39 weeks. The Statutory Maternity Pay (SMP) for working women who fulfil the more demanding conditions is paid by the employer at a rate of 90% of earnings (without an upper limit) for the first 6 weeks and with the limit of £145,18 per week for the rest of the period. The Maternity Allowance (MA) reserved for other groups of working women including self-employed is paid by the Jobcentre Plus at a rate of 90% of previous earnings, but not more than £145.18 per week, with a lower limit of £27 per week. Certain working women (e.g. those who work in a company owned by the husband or partner) are entitled to the MA over a shorter period of 14 weeks. In general, British maternity allowances are secondary benefits, which broadly corresponds to the liberal and neoliberal social models. The full-rate equivalent (FRE) of maternity benefits is 12 weeks only.

The level of public preschool childcare was minimal until the 1990s. „Playgroups organized by parents (mothers) that required a great deal of parental involvement were the predominant form of care for preschool-aged children until the 1990s, but the short hours and the focus on three- and four-year-old children meant that these playgroups could not serve children of full-time working parents. Parents in need of full-day child care tended to rely on ... relatives and the private market of childminders. Concerns about a shrinking labour force and labour shortages, the major economic and social inequalities that were emerging as a result of

earnings inequalities, and increases in child poverty led the Conservative government to turn its attention to child care and early childhood education" [8]. At the end of the 1990s however, both Conservative and Labour governments initiated the introduction of limited state-financed pre-school education which resulted in a contribution to the cost of day care for children aged 3 and 4 for a very limited period. (Compulsory school attendance in Britain commences at the age of 5 and in Northern Ireland at the age of 4; in England, almost 60% of children aged 4 years attend preparatory classes at primary school.) The duration of funded childcare was originally set at 12.5 hours per week for 38 weeks per year and was later extended to 15 hours per week and expanded to include two-year-old children from low-income families. A further shift occurred in September 2018: for all children a further 15 hours per week was added subject to both parents working (if possible) for at least 16 hours per week for a salary in the amount of at least the applicable minimum wage (£125.28 per week) and a total annual family income of a maximum of £100,000. The weekly hourly allocation can be used up flexibly even for a period of less than 38 weeks per year. In principle, this constitutes a ("universal") allowance of up to £5,000 a year for the care of children aged 3 and 4 years. The concept of this allowance ("30 hours free childcare") lies on the border of the liberal and neoliberal social models.

In general, the modern liberal model of family benefits exhibits a coherent logic that corresponds to a system of low universal benefits. This model is "prone to" a greater or lesser transformation to the neoliberal model.

The **Christian-democratic social model** emphasises the crucial role of marriage and the family. The original version of this model was based on the traditional division of labour in the family. The modern version model emphasises the freedom of choice: parents should be free to decide whether to spend more time on work or on childcare.

The Christian-democratic model is dominated by personal income tax with the option of the joint taxation of spouses and built consistently on the ability-to-pay principle, with a pronounced progressivity and the non-taxation of the subsistence minimum of the family. In Germany, this model takes the form of tax deductions. In 2019, the subsistence minimum for each child is €7,620; the amount of the tax saving increases with rising earnings. The child allowances are considered as a major social element; the current allowances for 1st and 2nd children amount to €204 and for each further child €235 per month. Since 1996, an "optional system" allows taxpayers to choose between the child allowance or the child tax deduction. Child allowances are higher than the tax savings for lower- and middle-income families. The legal interpretation of the Constitutional Court assumed that the child's subsistence minimum cannot be taxed and that the tax exemption of this minimum may also be realised in the form of child allowances. Child allowances cover some one-third of the actual average cost of raising children.

For families with low incomes, a means-tested supplement to the child allowance is available in Germany for each child of up to €170 a month. The birth grant was abolished in 2004. The maternity allowance is a health insurance benefit; non-insured women are entitled to a reduced maternity allowance of up to a maximum of €210 (sometimes referred to as a birth grant in international surveys). The basic variant of the maternity allowance is of 14 weeks duration and is paid out at 100% of net earnings. The health insurance fund contributes €13 per calendar day to the maternity allowance, while the "rest", up to 100% of net earnings, is paid by the employer.

The German parental benefit is a state earnings-related benefit: the rate is 65% of the net income. The minimum amount of the parental benefit is €300 and the maximum €1,000 per month. The benefit is intended to compensate for the earnings of the parent; it allows the parent to work for up to 30 hours per week. The basic variant of the parental benefit is set at 14 months from the birth, from which the duration of maternity allowance is deducted. The total maternity and parental full-rate equivalent equals 42.6 weeks.

In July 2015, the parental benefit was supplemented by the so-called Plus option which allows for the doubling of the duration of the parental benefit at half the amount of the benefit. According to German sources, this development contributed significantly to the afore-mentioned freedom of choice between gainful employment and personal care for a child.

The provision and financing of childcare is diversified in Germany. Nurseries and crèches of various kinds are entitled to receive contributions from the federal and state governments and municipalities, thus resulting in the significant diversification of parental fees. Non-contributory care for preschool children is gradually being introduced to varying extents in individual municipalities and states in Germany. Since 2013, children from one year of age have enjoyed the legal right to a place in day crèches or nurseries etc., provided by the municipality.

Overall, the German family policy system is based to a considerable extent on the Christian-democratic social model, particularly with respect to the income tax and parental benefits concepts which are earnings-related to a high degree. According to the OECD, the option of the joint spousal income taxation presents a barrier to the greater involvement of mothers and women in general in the labour market. Developments in the field of childcare for preschool and school-age children suggest a movement towards the social-democratic model.

The **social-democratic social model** is based on the principle of social rights for everyone regardless of the family and the market; everyone (especially children) should be given "an equal chance" regardless of previous income or performance. In principle, both parents work (dual earner model). Each parent pays income tax separately; the joint spousal taxation and tax credits or deductions are simply not allowed. The model prefers public services to cash benefits.

Since March 2018, the universal child allowance in Sweden was at SEK 1,250 (€122) per month per child. Extra payments are available for second and further children in the household.

There is no birth grant in Sweden. Sweden has no separate maternity benefit: the parental benefit commences 60 days prior to the expected date of birth and is paid for up to 390 days to sickness insurance scheme participants in the amount of 80% of the gross wage with a minimum of SEK 250 and maximum of 967 per day. Social security benefits in Sweden are subject to personal income tax. The parental benefit for persons with no or low incomes is paid at a rate of SEK 250 per day. Following the 390 days, there are further 45 days of parental benefit at a flat rate of SEK 180 per day. The full-rate equivalent of the parental benefit available to mothers was at 34.7 weeks in 2016.

Preschool in Sweden is mandatory from age 3 to 6. Municipalities must offer preschool for children from the age of 1. Children whose parents are on parental leave must be offered a preschool place for at least 3 hours a day, or 15 hours a week. Some municipalities offer more. There are both municipal and independent preschools. 3 hours a day of public preschool attendance is free of charge. For further attendance, the municipality or the education provider determines the fees. Sweden's maximum-fee policy makes childcare affordable for everyone. Low-income families pay nothing while the costs for more affluent parents are capped at SEK 1,382 per month. Parents should spend 1 to 3 per cent of the family's income on childcare [7].

The Swedish system of family benefits and services is a typical example of the social-democratic social model. One of the results of this model is a low child poverty level.

The **neoliberal social model** considers children to be a private issue or an investment. Neoliberals adapt the personal income taxation by numerous and extensive deductions and credits. Due to them the US has the second highest level of rectified social spending in the world (behind France) and ... a very high child poverty rate.

While child benefits do not exist in the US, two "child" credits can be claimed from federal income tax: the Earned Income Tax Credit (EITC) provides substantial support to low- and moderate-income working parents and the newer Child Tax Credit (CTC) provides taxpayers up to $2,000 (up to $1,400 of which families can receive as a refundable credit for each dependent child under age 17). The CTC extends to middle-income and most upper-middle-income families as well. The EITC and CTC are best seen not as taxes but as tested transfer programs that happen to be administered through the tax code. Differing schedules by family type are a long-standing feature of the US tax system. The Tax Policy Center estimates that 91 percent of families with children will receive an average CTC of $2,420 in 2018. There are high error rates for the EITC. Studies by Treasury analysts indicate that only a minority of improper payments stem from fraudulent actions.

No birth grant exists in the USA. Several US states provide for paid leave with partial earnings compensation for several weeks such as California and New Jersey - 6 weeks at wage rates of 55% and 67% respectively. The full-rate equivalent of US maternity and parental benefits is zero weeks.

The pre-school age child care market is very fragmented in the US with varying levels of service quality across the various states. The federal and state governments provide grants aimed at easing the lack of availability of this type of care for low-income groups of workers. Child Care and Development Block Grant (CCDBG), a $5 billion federal block grant program, is the primary source of public funding for child care. Through CCDBG, the federal government provides grants to states to provide monthly subsidies or vouchers to low-income families. Parents pay a fee that is typically 10 percent of the cost of child care. About 2.6 million children receive federal subsidies through one of several funding sources, including CCDBG. Head Start and Early Head Start programs support the childcare needs of children living below the poverty level or those with disabilities. Head Start programs currently serve approximately 42 percent of income-eligible children, and Early Head Start programs serve less than 4 percent of income-eligible children. One federal tax credit available to businesses is the Employer Provided Child Care Credit, a credit for businesses who cover the costs of child care expenses for their employees. The credit is for 25 percent of expenses up to $150,000 per year. California State Preschool Program offers full and part-day pre-Kindergarten for 3- and 4-year olds with family incomes at or below 70 percent of the state median income and serves about 135,000 children across the state. US child care financing system is a confused collection of funding streams with no uniform goals, standards, or administrative structure [1].

Our comparative analysis of the main benefits of the four basic family policy models and of their interaction confirmed the characteristics shown in Figure 1. From the point of view of the median voter, the social-democratic model is the most sophisticated one in general terms. In practice, not only the parameters of the relevant systems but also the governance of the system constitutes important factors.

3   Results and Discussion

The current Czech system of family benefits and tax credits has been influenced significantly by the reforms over the past two decades. Up to 1995, universal child allowance paid out under the health insurance system had, for several decades, constituted the most significant benefit in this area. From 1996, child allowance was regulated by the State Social Support Act and was means-tested. The allowance had three levels: basic, upper and lower according to the income means-test result, with the criterion being a multiple of the subsistence minimum of the family. In 2008, the uniform level of allowance was introduced. The child allowance (CA) is differentiated according to the age of the dependent child. The last mini reform, introduced in 2018, was influenced by the neo-liberal policy of the KDU-ČSL political party: the amount of the allowance (CZK 500/610/700, according to age) was increased by CZK 300 per month but only for the children of working parents or the beneficiaries of a benefit based on employment and the replacement of income.

Tax reforms from 1993 introduced deductions from the income tax base for children. In 2005, this system was replaced by the refundable child tax credit (CTC) claimable by one of the parents. The amount of any negative income tax due to CTC is referred to as the "tax bonus", the amount of which is limited to CZK 60,300 per year and which is now "sufficient" for 3 children (originally 4.5 children). Income tax payers with an income of at least six times the minimum wage at the beginning of the tax year are entitled to claim the tax bonus. The amount of the CTC is currently CZK 15,204 per year for the 1st child, 9,404 for the 2nd child and 24,204 for the 3rd and further children. The parameters of both the CTC and CA change frequently according to the current political needs rather than being based on a clear concept (as is the case in Germany). Moreover, fraud concerning the tax bonus is on the increase. The Czech CTC + CA for one child roughly correspond to German child allowances in relation to average earnings, which serves to

illustrate the relatively low level of the CTC + CB in Czechia. However, with respect to two children, various international comparisons have suggested that the level of Czech benefits and credits is above the EU average in relation to earnings.

The birth grant was originally a universal health insurance benefit before it was re-classified as a universal state social support benefit. It became a means-tested benefit from 2011 initially only for the 1st child (CZK 13,000) and from 2015 also for the 2nd child (CZK 10,000). Currently, in order to qualify for the birth grant, the income of the parents must not exceed 2.7 times the family subsistence minimum.

Since 1987, the period of the receipt of the maternity benefit (MB) has been 28 weeks. It is a health insurance benefit, the calculation of which copies that of the sick benefit but at a higher rate. Reduced rates apply to those on above-average earnings. Women with above-average earnings are thus discriminated against compared to the usual construction of the calculation of health insurance benefits; for example, in Germany no reductions apply, rather an earnings limit is in place for the calculation of the benefit which is set at around 200% of NAE. The replacement rate of the MB, calculated on the assumption that the insured earns the average national wage, is 90.2% of the net wage. The OECD [6] mistakenly states a low replacement ratio of 62.6%, mainly due to not because the MB is not taxed. Consequently, the OECD has calculated the FRE at 17.5 weeks, whereas the correct figure is 25.3 weeks. Our recommendation for rationalising the system is simple: the MB should be paid in the amount of 100% of the gross wage (with a 200% earnings limit) for 25.3 weeks and the benefit should be taxed.

The parental allowance (PA) has long been regarded as the most "distinctive" Czech family benefit. The first variant of the benefit consisted of the "maternity allowance" (MA) which was introduced in 1970 "in order to encourage population development; it is provided to working women provided they care for their children and do not earn income from work during this time." The eligibility conditions of MA were analogous to those of maternity benefit; it was a health insurance benefit provided for children under the age of one year and subject to the suspension of work. The amount of the MA was universal. The parental allowance was introduced in 1990 and applied to children up to 4 years of age subject to the parental full-time childcare. Working was allowed for a maximum of 2 hours per day subject to a very low-income limit; subsequently this restriction was lifted. In 1996 the PA was incorporated into the State Social Support Act and the (monthly) amount of the benefit was limited to 1.1 times the subsistence minimum for the child's personal needs. The PA was thus transformed into a universal benefit provided without regard to previous employment. If the mother was not entitled to the MB, she was entitled to the PA instead of the MB (this applies up to now). Since 2004, no limit has been set on the income of the parents.

While the original MA/PA can be characterised as a modern liberal benefit, since 2008 the Christian-democratic model has predominated: the PA was transformed into a "three-speed" universal benefit involving the choice between the claiming of the benefit up to the child reaching 2, 3 or 4 years of age, with each "speed" associated with a different benefit amount (CZK 11,400, CZK 7,600, CZK 3,800 / up to the 21st month CZK 7,600). The development of the benefit continued with the unification of the total maximum amount of the PA at CZK 220,000 with a maximum monthly amount of CZK 11,500 from 2012. The benefit also applies to parents whose children attend childcare facilities. From 2 years of age, children can attend such facilities on an unlimited basis. This construction had a significant effect on the behaviour of mothers: the majority opted to remain at home until the child reached 3 years of age. The PA thus became a significant barrier to women returning to work, most of whom preferred to care for the child at home with an PA of CZK 7,600 than to return to the labour market. In addition, working husbands are unable to claim the spousal tax credit of CZK 2,070 monthly.

From 2018 the monthly limit of PA of CZK 11,400 was abolished, and the benefit was effectively transformed into a "baby bonus" of CZK 220,000, which can theoretically be used up in 6 months, but in practice 6.74 months. If the PA were calculated from the NAE (in fact, the wages of young women are significantly lower), the baby bonus could have been used up in 10.5 months. The dominant parameters in today's PA consist of the baby bonus of CZK 220,000 and a

monthly limit given by the amount of the MB. The Ministry of Labour and Social Affairs has recently proposed that the baby bonus be valorised to CZK 300,000.

The full-rate equivalent of the Czech PA according to OECD [6] was 35.6 weeks in 2016. Dividing the baby bonus of CZK 220,000 by the weekly net NAE of CZK 4,862 reveals an FRE of 45.2 weeks. The total Czech FRE for maternity + paternal benefits for 2016 is 25.3 + 45.2 = 70.5 weeks, thus resulting in a shift from 5th place in the OECD ranking to 3rd place behind Estonia (85 weeks) and Hungary (71.8 weeks).

„Parental allowances and other benefits available to families with young children reflect the Czech authorities´ preference for family-based childcare and are therefore tilted towards de-activating parents for relatively long periods" [5]. Czechia thus continues to apply the classical Christian-democratic model of the financing of all-day childcare in the family for 2-3 years. In 2014, the OECD recommended us to shorten the duration of MB and PA to just one year.

The simplest partial reform of Czech family benefit system would be to change the rate of the MB to 100% of the net wage accompanied by the abolition of reduction limits, which could be accomplished by moving the MB to 100% of the gross wage accompanied by the taxation of the MB. This reform should also include an earnings limit of 200% of NAE. Moreover, if we also add a minimum MB of 50% of NAE, it is possible to abolish the non-systemic "replacement" of the provision of the PA to uninsured women from the birth of the child.

Similarly, the PA could be reformed at least by increasing its maximum rate to 100% of the net wage. The maximal alternative consists of integrating the PA into the MB, which would also mean integration into the health insurance system. The proposed increase of the baby bonus to CZK 300,000 is in contradiction with the modernisation of the PA according to the Swedish and German patterns and OECD and EU recommendations. Moreover, the existing baby bonus of CZK 220,000 should be abolished in one or two steps. It is also necessary to abolish the spousal tax credit – if we want to apply the social-democratic social model and remove this barrier to the return or entry of mothers to the labour market.

A very low number of children under three years attend crèches and similar facilities, which almost do not exist in Czechia. The EU's target is the involvement of one-third of such children in such types of childcare and educational facilities. If modern countries like Germany and Sweden guarantee the right to a place in pre-school facilities from the child reaching one year of age, we should be able to support the same arrangement in Czechia. Our main problem in this respect is that the present Czech minority government prefers short-run marketing measures such as a big increase of parental allowance.

4   Conclusion

Czech family benefits and tax credits require paradigm reform, which would serve to anchor them in an effective social model. The OECD and EU lambast the Czech parental allowance due to its length of provision. The aggregate full-rate equivalent of the maternity benefit and parental allowance is 70.5 weeks!

Partial efforts allowing the claiming of the current baby bonus of CZK 220,000 over shorter periods have not yet led to a change in the behaviour of mothers who continue to show a preference for claiming the paid leave up to the child reaching 3 years of age. Overcoming this approach requires paradigm reforms that will lead at least to the payment of both benefits (or even better an integrated benefit) in the amount of the full net wage, preferably in the form of full gross wage compensation accompanied by the taxation of the benefits, with a limit of 200% of NAE and a minimum (even for uninsured mothers/parents) of 50% of NAE. In order to achieve the desired macroeconomic effect, it is necessary to introduce the right to a place for all children from one year of age in full-day preschool facilities at an affordable price or even free of charge. In this way it would be possible to "catch up" with e.g. Germany or Sweden. The proposed increase in the baby bonus to CZK 300,000 is in contradiction with the necessary paradigm reforms aimed at the application of the simple and effective social-democratic social model.

Child benefits and tax credits require paradigm reform, too. Neoliberal efforts at the international and domestic levels to apply tax credits to working low-income parents are not effective enough and lead to constant attempts at the greater or lesser modification of child tax credits and to the introduction of ever more complicated structures such as Universal Credit in the UK. It is an unreasonable assumption that the reintroduction of universal child benefits as the only form of such support for families with children in Czechia would reduce the interest of parents in working; the opponents should consider that child benefits are fully deducted when calculating the final social assistance benefit. The social-democratic social model is highly effective in this respect as well. However, we respect the potential public choice of the German optional system of child benefits and tax deductions and the joint spousal taxation that fits well into the Christian-democratic welfare regime.

Acknowledgement

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Splitting of Environmental Taxes Revenues in the EU

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Abstract

Currently, EU member states use different kinds of economic instruments of environmental protection. Besides their environmental impact, the main reason for economic instruments implementation is their fiscal impact, precisely revenues of public budgets. The main goal of this paper is to find similarities in EU-28, to find the groups of countries with the same fiscal impact of economic instruments on public budget revenues. The method of cluster analysis is used, based on EUROSTAT and EEX data sets for the year 2016. Three categories of economic instruments' revenues (per capita) are selected as a base for cluster analysis, with available data for all EU-28 countries – energy taxes without EU ETS, EU ETS and transport taxes. We can distinguish six clusters in total, precisely group A characteristic by low tax revenues and low EU ETS revenues, group B with high tax revenues and low EU ETS revenues, group C with low tax revenues and high EU ETS revenues, group D represented by middle tax revenues and middle EU ETS revenues, group E and group F, both represented by one country with extremely high tax revenues. Generally, countries of Central and Eastern Europe are not grouped only in one group, they have all low tax revenues, but there are differences in EU ETS revenues. Focusing on northern countries of EU, they are characteristic by rather higher or high tax revenues, but they are also split into different clusters.

Keywords: tax revenues; cluster analysis; energy taxation; transport taxation; EU ETS

JEL Classification: H23

1 Introduction

Currently, EU member states use different kinds of economic instruments of environmental protection. Besides their environmental impact, the main reason for economic instruments implementation is their fiscal impact, precisely revenues of public budgets. It is the case of environmental taxes in the energy and transport sector, tradable emission allowances, resource taxes/fees and pollution taxes/fees.

Regarding economic instruments use, there are differences between particular EU member states – different taxes are imposed in old EU countries, different in new member states, northern and southern countries. Some countries also use regional economic instruments. Both the total number and the main focus of particular instruments depend on EU legislation (mainly in the energy sector) and national legislation (mainly in the transport sector).

The main goal of this paper is to find similarities in EU-28, to find the groups of countries with the same fiscal impact of the economic instruments of environmental policy on public budget revenues.

For this purpose, two research questions are proposed:
1) Are there similar characteristics between the countries of Central and Eastern Europe?
2) Are there similar characteristics between northern countries of the EU?

2 Literature overview

Environmental policy employs a range of instruments for environmental protection. Together with other devices, economic tools constitute a mix whose individual components are chosen by the countries according to their environmental policy priorities.

One of the fundamental instruments of the mix is a so-called environmental tax [24]. The general concept of taxation for discharged pollution dwells on the idea that if the ecological and

social costs are not included in activities generating them, the government may set their value by applying appropriate taxes [16].

Mentioned in connection with the problem of global climate change is carbon tax as one of the environmental taxes usually imposed on the production, distribution or use of fossil fuels [22].

Focusing on emission allowances trading, the European Union established the EU Emissions Trading System (EU ETS), dealing with greenhouse gas emissions. Within the EU ETS, there are European Emissions Allowances – EUAs (since 2005) and European Aviation Allowances – EUAAs (since 2012). The regulatory framework of the EU ETS was mostly unchanged for the first two trading periods of its operation (2005 – 2012); however, the beginning of the third trading period in 2013 brings changes in common rules which should strengthen the system. Since the EU emission allowances were previously grandfathered [32] from the year 2013 the most important yield of the emission allowances is auctioned. Grandfathering was widely criticised, mostly because it introduced significant distortions to the EU ETS [11]. Auctioning is the most transparent method of allocating allowances and puts into practice the polluter pays principle [9]. We can say that policymakers give firms an incentive to move towards production that is less fossil-fuel intensive [1]. The market price of the allowances is determined by supply and demand. In the third trading period, there has only been one big exchange which can be used for emission rights trading – European Energy Exchange (EEX).

Regarding the analyses and modelling of both environmental taxes and tradable emission allowances systems, there are many studies. Focusing on environmental taxes, various investigations are simulating general environmental taxation impacts [2], distributional impacts [33] and competitiveness impacts [8]. Regarding the EU ETS, scientists have focused mostly on modelling and forecasting the prices of CO_2 emission allowances [3]; [20]; [5]; [13]; [19].

If we focus on recent scientific studies dealing with the carbon tax, we find out that those are namely case studies for specific countries analysing the impact of carbon tax introduction in those countries – for example in Spain where the authors focused on the direct and indirect effects of environmental tax on Spanish products, based on the CO_2 emission intensities. For this purpose, they applied environmental input-output (EIO) and price models; more details in for example Gemechu et al. [14].

Another scientific paper studies CO_2 taxation in its dual role as a climate and a fiscal policy instrument in Portugal (more details in Pereira and Pereira [25]). It develops marginal abatement cost curves for CO_2 emissions associated with CO_2 taxation using a dynamic general equilibrium model of the Portuguese economy. Another scientific study deals with carbon and energy taxation in Malaysia (more details in Solaymani [29]), which is one of the top CO_2-emitting countries in the ASEAN region. Other examples focused on the economic and environmental effects of the carbon tax in South Africa use the dynamic CGE modelling approach [30].

Scientific studies investigating the third EU ETS trading period are focused mainly on the analysis of the influence of the intervention of the regulator on the functioning of the EU ETS system and its parameters, especially on the development of the EUA price. Cretí and Joëts [6] deal with price bubbles, speculation and the development of the EUA price on the stock market. The authors conclude that the most significant fluctuations in prices are the result of the announcement of changes in climate protection or energy policies. A related theme is observed by Fan et al. [12] as well; the study presents a detailed overview of political measures taken by the regulator within the framework of the EU ETS system regarding the price of EUA permits during the period including all three trading phases (2005–2015). The authors focus on the agreement between the expected outcome, based on theoretical hypotheses, with the real result of the political measures taken and arrive at the conclusion that not all political activity leads in the desired direction.

Nevertheless, those events which did have a crucial influence on the EU ETS system demonstrate the theoretically awaited results, whether positive or negative. A study [28] focuses on the analysis of decision-making by individual ministries of finance in the Netherlands, Denmark and Germany in connection with intervention in and the regulation of the EU ETS

system. This analysis shows that these ministries were integral parts of the decision-making process. They supported intervention within the EU ETS framework, but, at the same time, also had, in their countries, varying goals, both fiscal and macroeconomic. Furthermore, their final decisions were determined by the political orientation of the given country (especially in the cases of Germany and the Netherlands). The price of tradable emissions allowances in the EU-ETS system is discussed by Brink et al. [4].

They particularly pointed to the current price of emission allowance on the market with emission allowances.

Finally, some authors consider environmental taxes and emission allowances similar to each other, namely in respect of their impact. For research into the interactions of the system of taxation with the environment-protection policies, Goulder [15] for example, includes the carbon tax, as well as the system of trading emission allowances into one group, called a "green tax". In his opinion, the two economic tools feature similar characteristics especially concerning the use of their returns if the tradable emission allowances are sold in auctions.

3 Material and Methods

The method of cluster analysis is used, based on EUROSTAT [10] and EEX [7] data sets for the year 2016. Environmental taxes revenues are published by EUROSTAT in categories of energy taxes, transport taxes, resource taxes and pollution taxes. Unfortunately, data for categories resource taxes and pollution taxes are not available for a significant part of countries. On the other hand, EU ETS auctions revenues data are available on EEX. Therefore, three categories of economic instruments' revenues are selected as a base for cluster analysis, with available data for all EU-28 countries.

Cluster analysis methods are used to differentiate objects into a system of categories, which on the one hand document the similarities of objects within a single category and on the other hand underline the differences of objects falling into different categories [18] or [23]. These methods are based on the usage of the rate of conformity (or rather non-conformity) of objects and clusters. This rate of non-conformity is expressed as the Euclidian distance between the two vectors Y and Z in Formula 1:

$$v_{YZ} = \sqrt{\sum_{i=1}^{k}(y_i - z_i)^2}. \qquad (1)$$

The paper uses hierarchical procedures, i.e. gradual clustering including the combinations of objects into clusters. The result is the construction of a hierarchy, or dendrogram (tree-like structure), depicting the formation of the cluster [17].

Ward's linkage method was applied in this paper. Ward's linkage method minimizes the sum of squares of any two theoretical clusters, which can be generated at every step of clustering [31]. Ward's method is treated as rather efficient, and it considers the size of the data sample, we are entitled to utilize it. It will get the optimal number of clusters, which will be further presented.

The cluster analysis is often applied to analyse of territorial units, e.g. in the regional analysis of the localization of large enterprises [27] or in research focused on the development of heterogeneity of EU countries [26].

4 Results and Discussion

Table 1 contains the basic descriptive characteristics of the selected variables. The outcomes show minimum, maximum, mean, standard deviation and variance.

We can see that revenues from the energy taxes, EU ETS and transport taxes have a high value of the variance. It is caused by different systems of environmental protection. There are

large disparities between the minimum and maximum values in all types of revenues within the EU countries.

Table 1: Descriptive Characteristics of Variables

Revenues	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Energy taxes without EU ETS, per capita	28	148.12	1461.66	521.09	296.78	88083.09
EU ETS, per capita	28	0.32	18.06	8.48	3.71	13.83
Transport taxes, per capita	28	9.52	766.59	164.38	171.44	29394.58

Source: own processing, based on EUROSTAT [10] and EEX [7].

For our research, the correlation analysis was used at first. The variables that have a correlation coefficient higher than 0.9 could distort the results of further investigation. There are no significant relationships between analyzed indicators. The data was standardized by the standard deviation for cluster analysis purposes. The number of observations was 28 for each indicator and state.

Table 2: Agglomeration schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	15	21	0.015	0	0	12
2	2	25	0.051	0	0	9
3	3	14	0.112	0	0	13
4	5	24	0.203	0	0	18
5	9	22	0.297	0	0	17
6	7	19	0.401	0	0	11
7	12	28	0.515	0	0	14
8	11	17	0.681	0	0	12
9	2	23	0.907	2	0	13
10	1	18	1.159	0	0	18
11	7	20	1.474	6	0	19
12	11	15	1.818	8	1	17
13	2	3	2.225	9	3	21
14	12	27	2.668	7	0	20
15	10	13	3.194	0	0	20
16	6	8	4.105	0	0	21
17	9	11	5.155	5	12	23
18	1	5	6.294	10	4	22
19	7	26	7.885	11	0	22
20	10	12	9.955	15	14	23
21	2	6	12.992	13	16	26
22	1	7	16.950	18	19	25
23	9	10	23.089	17	20	26
24	4	16	31.157	0	0	25
25	1	4	40.301	22	24	27
26	2	9	59.518	21	23	27
27	1	2	81.000	25	26	0

Source: own processing, based on EUROSTAT [10] and EEX [7].

Table 2 shows how the states are joined at each stage of the cluster analysis. This process of connection progresses until the moment in time when all the EU states are joined in one large cluster, which is represented by line 27. The coefficients represent the distances between two states or two already created clusters, joined on the next level. The next part of the table shows the phase when each cluster emerged. The last column shows the phase when the newly created cluster combined with another, already existing cluster.

Figure 1 presents the results of cluster analysis, the dendrogram using Ward linkage. It shows detected similarities between regions.

Dendrogram using Ward Linkage
Rescaled Distance Cluster Combine
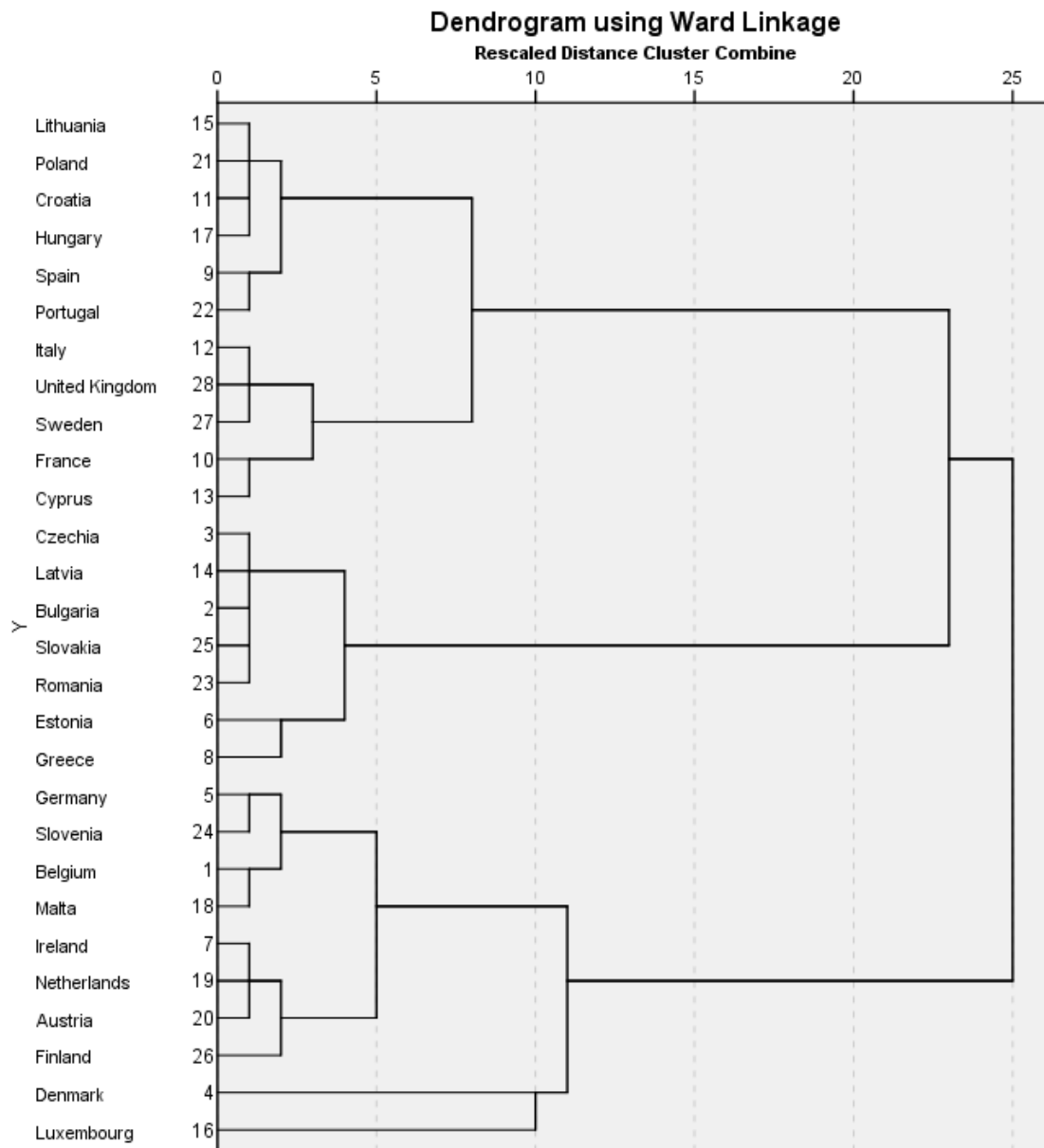
Source: own processing, based on EUROSTAT [10] and EEX [7].

Based on the dendrogram, we can distinguish six clusters in total, precisely:

- group A, characteristic by low tax revenues and low EU ETS revenues (Lithuania, Poland, Croatia, Hungary, Spain, Portugal),
- group B, with high tax revenues and low EU ETS revenues (Italy, UK, Sweden, France, Cyprus),
- group C, with low tax revenues and high EU ETS revenues (Czechia, Latvia, Bulgaria, Slovakia, Romania, Estonia, Greece),
- group D, represented by middle tax revenues and middle EU ETS revenues (Germany, Slovenia, Belgium, Malta, Ireland, Netherlands, Austria, Finland),
- group E, represented by one country with extremely high tax revenues (Denmark),
- group F, represented by one country with extremely high tax revenues (Luxembourg).

In the beginning, two research questions were set. Regarding evaluation of the first research question ("Are there similar characteristics between the countries of Central and

Eastern Europe?"), it is obvious, that countries of Central and Eastern Europe are not grouped only in one group, they have all low tax revenues, but there are differences in EU ETS revenues. Based on the results, we can see countries of Central and Eastern Europe in group A – Lithuania, Poland, Hungary; group C – Czechia, Latvia, Bulgaria, Slovakia, Romania, Estonia; and group D - Slovenia. The group, which is the most typical for countries of Central and Eastern Europe is group C, with low tax revenues and high EU ETS revenues. There is only one additional state, Greece.

Concerning the second research question ("Are there similar characteristics between northern countries of EU?"), we can say that northern countries of EU are characteristic by rather higher or high tax revenues, but they are split to different clusters. We can see northern countries of EU in group B – Sweden, group D – Belgium, Netherlands, Finland) and group E – Denmark. The group, which is the most typical for northern countries of EU is group D, represented by middle tax revenues and middle EU ETS revenues.

Since the analysis is based only on revenues data from the year 2016 and other economic data were not involved, we can only estimate that the groups of countries are also influenced by similar economic development. It will be worth in future research to add more economic variables to the cluster analysis or to compare clusters in different years.

Regarding the results, the general recommendation for policymakers can be to focus on why there are in some countries lower tax revenues than in the rest of them. Dealing with EU ETS revenues, some countries are probably better traders and can earn more money from the auctions since the auction prices depend on current demand on the exchange [35].

Comparing the results with other scientific studies, Liapis et al. [21] focused on clusters of economic similarities between EU countries, calculating with different categories of economic indicators, including tax revenues. Based on the study, within the area of tax revenues, the notable groups of countries are Belgium and Italy, Greece and Portugal, Germany and Austria, Finland and Sweden. The other countries are left alone. However, this analysis [21] does not include all EU countries and the environmental tax revenues are not included in the category "tax revenues".

Another study by Zaharia et al. [34] focuses on environmental taxation in EU countries, but EU ETS is a part of category energy taxes. Based on the study, clusters in the year 2012 were represented as follows: cluster 1 comprises Bulgaria, the Czech Republic, Germany, Estonia, Latvia, Luxembourg, Hungary, Poland, Portugal, Sweden, United Kingdom; cluster 2 includes Greece, Italy, Cyprus, Malta, Austria, Finland; cluster 3 consists of Spain, France, Lithuania, Romania, Slovakia; cluster 4 composes of Belgium, Ireland, Iceland and Norway; cluster 5 includes Denmark, Croatia and Netherlands and cluster 6 consists of only one country: Slovenia.

5 Conclusion

The main goal of this paper was to find similarities in EU-28, to find the groups of countries with the same fiscal impact of the economic instruments of environmental policy on public budget revenues. The method of cluster analysis was used, based on EUROSTAT and EEX data sets for the year 2016. Three categories of economic instruments' revenues (per capita) were selected as a base for cluster analysis, with available data for all EU-28 countries – energy taxes without EU ETS, EU ETS and transport taxes.

Based on the results, we can distinguish six clusters in total, precisely group A (Lithuania, Poland, Croatia, Hungary, Spain, Portugal) characteristic by low tax revenues and low EU ETS revenues, group B (Italy, UK, Sweden, France, Cyprus) with high tax revenues and low EU ETS revenues, group C (Czechia, Latvia, Bulgaria, Slovakia, Romania, Estonia, Greece), with low tax revenues and high EU ETS revenues, group D (Germany, Slovenia, Belgium, Malta, Ireland, Netherlands, Austria, Finland) represented by middle tax revenues and middle EU ETS revenues, group E (Denmark) and group F (Luxembourg), both represented by one country with extremely high tax revenues. Generally, countries of Central and Eastern Europe are not grouped only in one group, they have all low tax revenues, but there are differences in EU ETS revenues.

Focusing on northern countries of EU, they are characteristic by rather higher or high tax revenues, but they are also split into different clusters.

Regarding our future research, it will be worth to add more economic variables to the cluster analysis, to focus on spatial aspects of particular economic instruments of environmental policy or to compare clusters in different years. It can help to improve the efficiency of both the tools and the policy as a whole.

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