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Investment Decision-Making in the Period of Economic Recovery

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2014

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CONTENT

Session 7 Trade, Tourism and Marketing

Preface

In recent times, one of the most frequently discussed questions among academics and practicing economists has been about the end of the recession and a new dawn of economic growth. Even though the economic recovery had been keenly anticipated, when it came, it brought with it a number of non-trivial decision making problems within private and government sectors. Corporations, governments and central banks have to decide the optimal form and timing of exit strategies, which is not easy considering the uncertainty in the length and size of any future economic growth, not to mention the contemporary geopolitical risks.

Among the most difficult decision-making problems are those decisions about private and government investments. At the same time, attention should be paid to the possible effects of the restored economic growth and adopted policies on income and wealth inequalities in society and on environmental consequences. The INPROFORUM 2014 conference offers the opportunity to discuss these contentious issues.

(Milan Jílek)

Session 1

Economic Recovery? Environmental, Economic and Social Consequences for Regional Development

The International Scientific Conference INPROFORUM 2014, *November 6 - 7, 2014, České Budějovice*, 11-15, ISBN 978-80-7394-484-1.

The Human Development Index in Global Context

Maria Ramona Sârbu[1]

Abstract: *The Human Development Index (HDI) shows a global measurement that compares the progress of human development both temporally and spatially depending on three essential components – health, education and living standard. This index provides an overall evaluation of the progress made by countries and, in the context of sustainability, HDI delivers important information on one of the main prerequisites of sustainable development, which is ensuring human welfare on the long term. The purpose of the paper is to make an analysis of human capital development in Romania and to rank Romania within the general hierarchy and within the averages of both the Central and Eastern Europe (CEE) countries and countries around the world. For this purpose, the Human Development Index (HDI) was used and analyzed. Data analysis shows that in recent years the HDI of Romania increased from year to year, reaching a HDI value of 0.785 in 2013, according to the Human Development Report 2014. Thus, Romania ranks 54th out of 187 countries worldwide and is categorized as a country with a high level of human development.*

Key words: Human Development · HDI · Human Capital

JEL Classification: I15 · I25

1 Introduction

The Human Development Index (HDI) was created at the initiative of the United Nations Development Programme (UNDP), with the theoretical support of economists such as Amartya Sen, Mahbub ul Haq, Gustav Ranis, Meghnad Desai. This index allows an overall assessment of the progress made by countries and, in the context of sustainability, HDI delivers important information on one of the main prerequisites of sustainable development, which is ensuring human welfare on the long term.

At the beginning of the 21st century, human development is still in the initial stage in most countries, as well as at a global scale, due to the many marked discrepancies and gaps that affect human development (Adumitracesei, 2009). HDI analysis must take into account that the analysts consider that this indicator does not include issues related to environmental degradation (Iacovoiu, 2009). Therefore & Neumayer (2012) proposes a combination of human development index and ecological footprint index, in order to assess the level of sustainability of an economy. Heal (2012) discusses the implications of economic and social development as follows: "while we are leaving future generations less natural capital than we inherited, we are leaving them more than we inherited in terms of built capital: more freeways, airports, buildings, and infrastructure. We are also leaving them more intellectual capital than we inherited: our R&D programs are developing cures for diseases, new products, and new ways of doing things. In only the last twenty years the Internet and wireless communications have come from nowhere to dominate our lifestyles: we will hand these on to our successors, together with other things not yet invented, perhaps offsetting or compensating for the depleted environment that we are also leaving them".

The purpose of the paper is to make an analysis of human capital development in Romania and to rank Romania within the general hierarchy and within the averages of he Central and Eastern Europe (CEE) countries and countries around the world. For this purpose, the Human Development Index (HDI) was used and analyzed.

2 Methods

In this section, a brief presentation is made of the methodology for calculating the HDI. This is important given that the methodology has improved from one report to the next and the use of an old methodology for new data would provide results different from those already published in previous reports. Methodologically, the technical notes published on the website of UNDP should be used. The human development index is calculated using the indicators of life expectancy, education and living standard, calculated as the arithmetic mean:

$$HDI = (IHealth + IEducation + IIncome) / 3 \quad (1)$$

$$\text{Health Index} = (LE - 20) / (85 - 20) \quad (2)$$

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where:
LE life expactancy at birth (years)
20 minimum life expectancy at birth (years) considered an expressed in number of years
85 maximum life expectancy at birth (years) considered an expressed in number of years

Education Index = MYSI + EYSI / 2 (3)

where:
MYSI mean years of schooling index
EYSI expected years of schooling index

MYSI = (MYS - 0) / (15- 0) (3.1)

where:
MYS mean years of schooling index

EYSI = EYS / 18 (3.2)

where:
EYS expected years of schooling

Income Index = ln (GNI pc) - ln (100) / (ln75000) - ln(100) (4)

where:
75000 maximum value of Gross National Income (GNI) per capita
100 minimum value of Gross National Income (GNI) per capita

According to the latest available data, the HDI of 2013 was calculated based on the following data:
- Life expectancy at birth (years) = 73.8
- Mean years of schooling = 10.7
- Expected years of schooling = 14.1
- GNI per capita = 17.433 $ per capita

3 Research results

The calculations have brought the following values:

Health Index = (73.8 - 20) /(85 - 20) = 53.8 /65 = 0.828 (1)

Education Index= MYSI + EYSI / 2 = (0.713 + 0.783) / 2 = 0.748 (2)

Mean years of schooling = (10.7 - 0) / (15 - 0) = 0.713 (2.1)

Expected years of schooling = 14.1 / 18 = 0.783 (2.2)

Income Index = ln (GNI pc) - ln (100) / ln(75000) - ln(100) = (4.241 - 2) / (4.875 - 2) = 0.779 (3)

HDI = (IHealth +IEducation+ IIncome) / 3 = (0.828 + 0.748 + 0.779) / 3 = 0.785

With a value of 0.785, Romania ranks 54 out of 187 countries, in a hierarchy where Norway, Australia and Switzerland are ranked first.

3.1 Components of the Human Development Index

HDI quantifies three main aspects of human development: 1) life expectancy at birth, as measured by the index of the average life expectancy; 2) knowledge / education, as measured by mean years of schooling of the adult population aged over 25 years and the expected years of schooling index; 3) a decent standard of living, as measured by gross national income (GNI) per capita (expressed in USD purchasing power parity).

The first two components of the HDI are the most important areas of human capital, namely, health (as a contributor to the increase of life expectancy) and education (as a significant factor in increasing labor productivity and of the real income, respectively). Both health and education are found in the living standard (expressed by GNI per capita), as the

human capital is able to make more prolonged and intense effort when it is less affected by diseases (hence the capacity of producing a higher volume of goods and services), and a better prepared workforce can increase the volume of output by increasing the efficiency in the processing of scarce resources and by including skills, competencies, knowledge and technologies in the productive process (Mursa, 2007).

This composite index should not be seen as a purely mathematical index that attempts to contain within a single value complex realities of human development, such as political freedom, social relationships between individuals, concern for the environment, the physical security of the person. All these terms are much more difficult to measure directly with the human development index. As a national average, HDI does not refer to variations that might occur within a country. In this respect, it is obvious that the levels of human development are differently distributed from one geographic region to another or from one social class to another.

Based on HDI, countries fall into four categories:

- countries with very high human development (1.000 to 0.800),
- countries with high human development (0.799 to 0.700) and Romania is counted among them,
- countries with medium human development (0.699 to 0.550),
- countries with low human development, with a value of less than 0.550.

Out of the 187 countries ranked on the HDI of 2013, 49 countries are considered to have a very high human development, 53 with high human development, 42 with medium human development and 43 with low human development. Norway, Australia and Switzerland are ranked first in the hierarchy, while countries, such as Central African Republic, Congo and Nigeria are at the bottom of the ranking.

3.2 Current status of Romania in terms of HDI (2013) as compared to the global average

Table 1 shows the indicators of human development and the three HDI components in the case of Romania, as compared to the global average for 2013. When the three HDI components are analyzed according to the Human Development Report 2014, life expectancy at birth (73.8) proves to be higher in Romania than the global average (70.8). Romania also lies above the global average in terms of education indicators and per capita gross national income. In 2013, Romania had a value of GNI per capita (17.433 $) which is above the global average (13.723 $).

Table 1 HDI of Romania (2013) as compared to the global average

HDI of Romania (2013) as compared to the global average					
Year		Human Development Index (HDI)	Life expectancy at birth	Mean Expected years of schooling years of schooling	Expected years of schooling
2013	World	0.702	70.8	7.7	12.2
	Romania	0.785	73.8	10.7	14.1

Source: Own processing based on United Nations Development Programme (2014)

3.3 Overall human development around the world

According to the data of the Human Development Report 2014 on trends of the HDI, the profile of the human development in Romania has changed. The HDI value increased from 0.706 in 2000 to 0.785 in 2013, above the global average of 0.702. When compared to other countries around the world, in 2013, Romania had a HDI value of 0.785, which is above the average of the Arab States (0.682), above the average of East Asia and the Pacific (0.703), above the average of Europe and Central Asia (0.738), above the average of Latin America and the Caribbean (0.740), above the average of South Asia (0.588) and above the average of Sub-Saharan Africa (0.502). However, the Human Development Report 2014 shows that the index values of Romania are lower as compared to other countries of Central and Eastern Europe (CEE), as Romania was under the value of Slovenia (0.874), Czech Republic (0.861), Poland (0.834), Slovakia (0.830), Hungary (0.818), due to the low values of the recorded component indices, especially to the value of the gross national income (GNI) per capita and to the index of life expectancy at birth, but above Russia (0.778), Bulgaria (0.777) and Ukraine (0.734) (see Table 2). But on a closer analysis, the growth rate of Romania is higher, while Slovenia, Poland, Hungary have shown a decline in the last decade. In the context of Central and Eastern Europe, Romania shows an increase of 0.82 percent in HDI, which is almost the highest among the countries of Central and Eastern Europe. This 0.82% growth rate of HDI in Romania is a proof that Romania has made a substantial progress in human development in the period 2000 to 2013.

Table 2. Human Development Index trends, 2000 - 2013

Human Development Index trends, 2000 - 2013								
HDI rank	**Country/ Region**	**2000**	**2005**	**2010**	**2011**	**2012**	**2013**	**Average annual HDI growth % 2000-2013**
	Arab States	0.611	0.644	0.675	0.678	0.681	0.682	0.85
	East Asia and the Pacific	0.595	0.641	0.688	0.695	0.699	0.703	1.29
	Europe and Central Asia	0.665	0.700	0.726	0.733	0.735	0.738	0.80
	Latin America and the Caribbean	0.683	0.705	0.734	0.737	0.739	0.740	0.62
	South Asia	0.491	0.533	0.573	0.582	0.586	0.588	1.39
	Sub-Saharan Africa	0.421	0.452	0.488	0.495	0.499	0.502	1.37
	World	0.639	0.667	0.693	0.698	0.700	0.702	0.73
1	Norway	0.910	0.935	0.939	0.941	0.943	0.944	0.28
2	Australia	0.898	0.912	0.926	0.928	0.931	0.933	0.29
3	Switzerland	0.886	0.901	0.915	0.914	0.916	0.917	0.27
4	Netherlands	0.874	0.888	0.904	0.914	0.915	0.915	0.35
	...							
25	Slovenia	0.821	0.855	0.873	0.874	0.874	0.874	0.48
	...							
28	Czech Republic	0.806	0.845	0.858	0.861	0.861	0.861	0.52
	...							
35	Poland	0.784	0.803	0.826	0.830	0.833	0.834	0.48
	...							
37	Slovakia	0.776	0.803	0.826	0.827	0.829	0.830	0.51
	...							
43	Hungary	0.774	0.805	0.817	0.817	0.817	0.818	0.43
	...							
53	Belarus	..	0.725	0.779	0.784	0.785	0.786	..
54	Romania	0.706	0.750	0.779	0.782	0.782	0.785	0.82
55	Libya	0.745	0.772	0.799	0.753	0.789	0.784	0.40
	...							
57	Russian Federation	0.717	0.750	0.773	0.775	0.777	0.778	0.64
58	Bulgaria	0.714	0.749	0.773	0.774	0.776	0.777	0.66
	...							
69	Turkey	0.653	0.687	0.738	0.752	0.756	0.759	1.16
	...							
83	Ukraine	0.668	0.713	0.726	0.730	0.733	0.734	0.73
	...							
185	Central African Republic	0.314	0.327	0.355	0.361	0.365	0.341	0.61
186	Congo (Democratic Republic of the)	0.274	0.292	0.319	0.323	0.333	0.338	1.64
187	Niger	0.262	0.293	0.323	0.328	0.335	0.337	1.95

Source: Own processing based on UNDP, Human Development Report Statistical Tables 2014 (http://hdr.undp.org/en/2014-report/download)

4 Conclusions

An important conclusion is that there is a relation between HDI values and the level of the economic development of the countries around the world (Neagu, 2010). Countries such as Slovenia, Czech Republic, Hungary and Turkey had a significant improvement of HDI in the context of the economic growth followed by an increase in GDP / GNI per capita in the period 2000 to 2013.

It should be noted that there are also and the cases in which "a country can record very high economic growth rates without making progress in terms of development but as well, a country can record a negative economic growth rates without regressing from the point of view of development due to the contribution of quantitative economic growth process" (Haller, 2013, p. 59).

The calculation of indicators and international comparisons provide data on the development of the countries from multiple perspectives and can help taking measures to achieve the objectives. The rank of a country at a certain moment can provide an overview of the evolution of the economic and social activities.

Data analysis shows that despite the modest ranking of Romania, the HDI of Romania had a positive trend, with almost the largest increase in the context of CEE countries in 2013. In recent years, the HDI of Romania increased from year to year, reaching a HDI value of 0.785 in 2013, according to the Human Development Report 2014. Thus, Romania ranks 54th out of 187 countries worldwide and is categorized as a country with a high level of human development. The 0.82 percent growth rate of HDI in Romania is a proof that Romania has made substantial progress in human development in the period 2000 to 2013.

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How to Undermine Ideas of Green Growth: Case of Photovoltaic Electricity Production in the Czech Republic

Jan Vávra[1]

Abstract: *This paper focuses on the boom of photovoltaic electricity sector in the Czech Republic in years 2007–2010. According to the 2001 EU directive, a legislation supporting the renewable electricity production passed through the Czech parliament in 2005. It was not flexible enough to allow responsible institutions to change the guaranteed subsidies (feed-in-tariffs) significantly to react to the 2007–2009 fall of investment costs of the photovoltaic industry. As a result of this the installed output of photovoltaic power stations rose from 0,01 % of overall installed output in 2007 to 9,7 % in 2010. Legislation cut the feed-in-tariffs for new power stations strictly in 2010 and a retroactive tax was put on some of those already built.*

Implementation of the photovoltaics resulted in various problems, including the legal and socio-political issues. Its economic effectiveness is also questionable. Moreover, the problematic case led to the decrease of subsidies to other renewable sources of energy and to some extent also to the negative perception of renewables as whole. Using the data from governmental agencies and public sources of information (laws, reports, statistical sources and media) this paper aims to describe the implementation process and discuss some potential consequences of the problematic realization of the subsidies. Though the Czech case was not intentionally labelled as "green growth" policy, it is framed as a part of green growth, due to being in accordance with its strong focus on the renewable sources of energy.

Key words: Photovoltaics · Electricity · Solar · Green Growth · Green Economy · Czech Republic

JEL Classification: Q42 · Q48 · Q55

1 Introduction

After 2007–2008 financial crisis and subsequent economic recession, the idea of growth revival gained importance in many countries. The concept of "green growth" (or "green economy") became popular among the policymakers, mainly in the supranational organizations. The term "green economy" has been already used before (see Pearce, Markandya, & Barbier, 1989; UNESC, 2005), but it received new momentum in the time of recent economic problems. In 2008 members of Worldwatch Institute presented the green economy concept to G20 leaders. Their goal was to kickstart the global economy in more environmentally friendly way, while creating more jobs, lowering inequality and focusing on development than on growth (Gardner & Renner, 2008). One year later, the report Rethinking the Economic Recovery: A Global Green New Deal (Barbier, 2009) was prepared for United Nations Environmental Programme, which adopted it (UNEP, 2009) and developed it into the concept of green economy (UNEP, 2011), emphasized also at Rio+20 conference (UN, 2012). Organization for Economic Co-operation and Development prepared its own conception of green growth (OECD, 2011), as well as The World Bank (2012). Though there are some small differences in the definitions and conceptions, we can summarize the main points of the green growth/economy ideas. Green growth[2] merges such economic policies, which emphasize renewable sources of energy, resource and energy efficiency, decrease of environmental pressure, lower carbon dependency, while fostering economic growth, lowering inequality and decreasing poverty.[3]

Energy from renewable sources is one of the crucial parts of the green growth policies. This paper focuses on the case of the increase of solar electricity production (photovoltaics) in the Czech Republic. The increase of solar electricity sector in the Czech Republic was not framed by any official green growth governmental policy or conception, nevertheless it is directly in line with the ideas of green growth. I would like to present the context of increase of solar electricity production in the country and discuss some problematic issues. My research questions are: What was the legal and financial framework for the support of the solar electricity? How did the production of solar electricity increase? How were the rules applied? Some possible consequences of the implementation process and efficiency of the supporting scheme are considered in the discussion. Due to the limited space of this paper, it is rather a starting point for future more detailed analysis.

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[2] From this point on, I use the "green growth" as a general term for these economic policies.

[3] Green growth is presented as a part of sustainable development, not its substitution, however there is much criticism of its pro-growth orientation, neglecting of rebound effect, insisting on neo-liberal globalized economy, etc. (see e.g. Santarius, 2012; Cudlínová, 2014; Wanner, 2014).

2 Methods

The paper presents results of desk study research, mostly employing the analysis and comparison of data and literature, including both primary sources (legislative documents, governmental strategies, reports of the authorities, and articles in media), some secondary literature (research papers and analyses) is also included.

3 Research results

In 2001 the EU 2001/77/EC Directive on the Promotion of Electricity Produced from Renewable Energy Sources in the Internal Electricity Market (European Parliament and Council of European Union, 2001) set the indicative target of 12% of gross domestic energy consumption from renewable sources of energy by 2010. This directive was implemented into the Czech legislation in 2005 via the 180/2005 Act on Promotion of Use of Renewable Sources (Sbírka zákonů, 2005), which established the framework for state support of renewable energy. The indicative target for gross electricity consumption from renewables was set to 8% by 2010. To promote this, the act offered 15 years period of guaranteed feed-in tariffs to reach 15 year repayment period for the producers of energy from renewable sources. The price of feed-in tariffs had to be defined by the Czech Energy Regulatory Office on annual basis and could differ for various sources of energy to reflect the investment price. Original proposal of the bill allowed Energy Regulatory Office to change the guaranteed feed-in tariff only for 10% from year to year.[4] However, this method of state intervention was even more restricted during the legislation process and the bill was passed with only 5% possible change of feed-in-tariffs.

The producer of renewable electricity has to choose from two forms of the feed-in-tariff: guaranteed purchase price or market price plus so called Green bonus (Sbírka zákonů, 2005). In both cases, the distributor is obliged to buy the electricity from the producer (who can decide which payment scheme is better for him). In our study, we focus only on the guaranteed purchase prices (hereinafter labelled as feed-in-tariff). Table 1 shows the feed-in-tariffs for selected renewable sources of energy, according to their year of construction.

Table 1 Feed-in-tariffs of various renewable energy sources in CZK/MWh (€/MWh)

Year	Type of power station						
	SOLAR	**SH**	**SH-N**	**BIO**[##]	**BIO-N**	**WIND**	**GEO**
2004	7 418 (271)	1 988 (73)	-	3 210 (117)	-	3 413 (125)	4 590 (168)
2005	7 418 (271)	2 549 (93)	-	3 210 (117)	-	3 247 (119)	4 590 (168)
2006	15 565 (568)	2 549 (93)	2 831 (103)	3 210 (117)	-	2 965 (108)	4 590 (168)
2007	15 565 (568)	2 549 (93)	2 831 (103)	3 210 (117)	-	2 913 (107)	4 590 (168)
2008	15 180 (554)	2 549 (93)	2 997 (109)	-	3 580 (131)	2 841 (104)	4 590 (168)
2009	14 191 (518)[*]	2 549 (93)	2 997 (109)	-	3 580 (131)	2 591 (95)	4 590 (168)
2010	13 213 (482)[*]	2 549 (93)	3 257 (119)	-	3 580 (131)	2 425 (89)	4 590 (168)
2011	6 687 (244)[**]	2 549 (93)	3 184 (116)	-	3 580 (131)	2 373 (87)	4 590 (168)
2012	6 410 (234)[***]	2 549 (93)	3 319 (121)	-	3 580 (131)	2 321 (85)	4 590 (168)
2013	2 973 (109)[#]	2 549 (93)	3 295 (120)	-	2 773 (131)	2 162 (79)	3 356 (122)
2014	0 (0)	2 499 (91)	3 230 (118)	-	2 321 (131)	2 014 (74)	3 290 (120)

Note: Only selected types of power stations are listed. Year stands for year of construction of the power station. SOLAR = photovoltaic, SH = small hydroelectric (≤ 10 MW), SH-N = new small hydroelectric, BIO = pure biomass, BIO-N = pure biomass in new p. s., WIND = wind, GEO = geothermal. If there are one- and two-tariff prices, we use the one-tariff. When the data are missing (-), the support for such type of power station was defined in another category. Numbers are in CZK, numbers in bracket in Euro, exchange rate 1 € = 27,4 CZK.

[*] Average of two price levels according to the output. [**] Average of three price levels according to the output. [***] Only power stations with output ≤ 30 kW are supported. [#] Average prices of the year (two output-price levels, two time periods), only power station with output ≤ 30 kW are supported. [##] In case of biomass, the price is average of various prices according to the biomass category.

Source: Own processing based on Energy Regulatory Office data (Energetický regulační úřad, 2013).

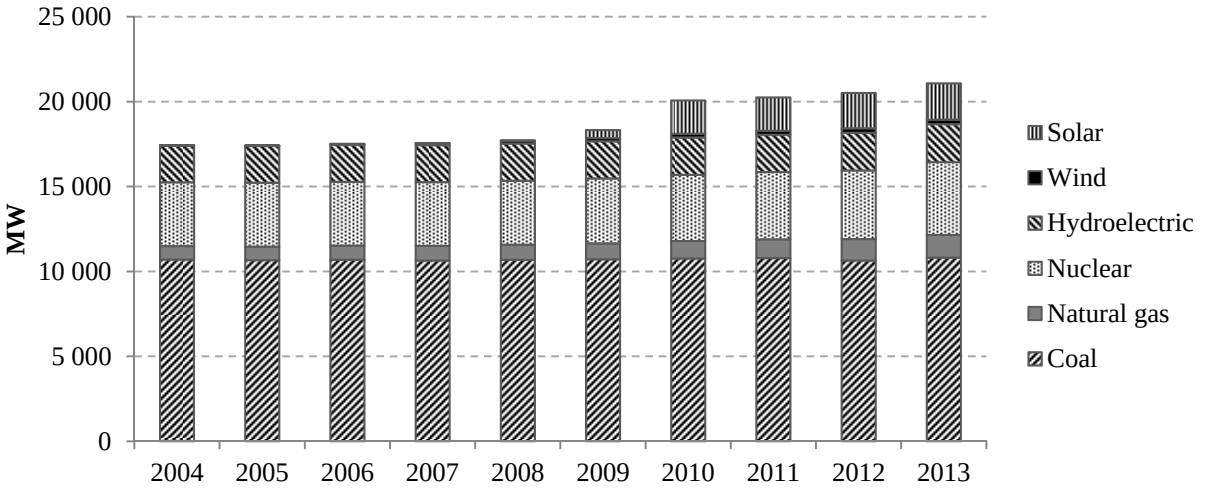
Tariffs for photovoltaic (solar) power stations were higher than any other since the enactment of the Act on renewable energy. While feed-in-tariffs for hydroelectric, biomass, wind or geothermal power station remained quite stable, tariff for solar power has doubled between 2005 and 2006, thus reaching 15 565 CZK/MWh (568 €).[5] However, the investment costs of solar power stations have fallen rapidly in recent years (Wile, 2013), mostly due to the expansion of cheap technology from China (Feltus, 2010; Woody, 2013). In Czech conditions, the reported decrease of price

[4] For example, the long-term feed-in tariff for power plant established in 2006 could not be lower for more than 10% than the feed-in tariff for power plant established in 2005. Anyway, the feed-in tariff given in the beginning is valid for the whole period of 15 years.

[5] The conversion rate 1 € = 27,4 CZK is used in this paper.

of solar panels was approximately 40% in period 2007–2009 (BDO Audit, 2012). Decrease of the costs of investment and high guaranteed feed-in-tariffs caused boom of solar power industry. The installed output rose mostly in years 2009 and 2010. While in 2008 the overall installed output of solar power industry was 40 MW (0.2% of overall installed output), in 2009 it was already 465 MW (2.5%) and in 2010 the output reached 1 959 MW (9.8%). Since then, it increased only slightly to 2 132 MW (10.1%) in 2013 (Energetický regulační úřad, 2013) (see Figure 1).

Figure 1 Installed output in Czech power stations



Source: Own processing based on Energy Regulatory Office data (Energetický regulační úřad, 2014)

The increase of installed output definitely brought some environmentally positive outcomes in terms of low carbon energy. Electricity production from renewable has increased. In 2005, only 4.4% of gross domestic consumption of electricity was produced in renewable sources (78% of it hydroelectric, 18 % biomass). Five years later, in 2010, the share of renewable electricity made 8.3%, of which only 47 % was generated by hydroelectric, 26% by biomass, 10% biogas, 10% solar and 6% wind. Latest data (2013) indicate 13.2% of renewables in gross domestic electricity consumption. The overall renewable electricity consists of 29% hydroelectric, 24% biogas, 22% solar, 18% biomass and 5% wind. The installed output of solar power stations in 2013 was 2 132 MW (10.1% of overall installed output), but the production was only 2 070 GWh (2.4% of overall gross domestic production), due to the specifics of the solar power stations and natural conditions (Energetický regulační úřad, 2014).

In period 2008–2010 the investment costs of solar power stations fell rapidly, but the Energy Regulatory Office's ability to lower guaranteed feed-in-tariffs for new power station according to the decreased investment costs was limited by the law (only 5% change from year to year). Energy Regulatory Office officers started to be aware of the dynamic increase of solar power stations in 2008 and in 2009 the Office negotiated with the Government about possible measures to lower the feed-in-tariffs for new power stations. However, in 2009 no principal change of legislation was agreed, which lead to highest capacity installed in 2010 (BDO Audit, 2012). Energy Regulatory Office only set newly two feed-in-tariffs, 14 234 CZK/MWh (520 €) for small power station (≤ 30kWh), and 14 139 CZK/MWh (516 €) for large ones (> 30 kWh) (Energetický regulační úřad, 2013).

More radical legislative changes happened in year 2010. Amendment 137/2010 allowed Energy Regulatory Office to lower the feed-in-tariff by more than 5 % for the power stations with repayment period shorter than 11 years (Sbírka zákonů, 2010a). Amendment 330/2010 limited the feed-in-tariffs only for the small on-roof (or wall) power stations (≤ 30 kWh). This applied for the facilities constructed since 2011 onwards (Sbírka zákonů, 2010b). Finally, the 26% tax on electricity produced by solar power stations was introduced. Act 402/2010 imposed this tax on all of the electricity produced from 2011 to 2013 in power stations constructed in 2009 and 2010, except small on-roof (wall) power stations (≤ 30kWh) (Sbírka zákonů, 2010c). These legislative processes led to massive drop in the feed-in-tariffs between 2010 and 2011 (see Table 1). Since 2011, only small power stations receive the guaranteed feed-in-tariffs. The subsidy for power stations constructed in second half of 2013 dropped to 3 050 CZK (111 €) for capacity ≤ 5 kWh and 2 479 CZK/MWh (90 €) for capacity 5–30 kWh (Energetický regulační úřad, 2013). From 2014 onwards, the feed-in-tariff for solar power generation was abolished (Vláda České republiky, 2013). While the new solar power stations are not supported by feed-in-tariffs, the already operating stations are still subsidized, according to the legislation valid in the year of their construction.

4 Discussion

The implementation of the subsidies for solar electricity brought some problems. The economic costs of the subsidies for the solar power stations are paid by the consumers (households, business and industry) through the price of electricity and directly from the state budget. What is very problematic in this context is the low efficiency of the subsidies. Radziwill (2012, p. 19) shows, that in 2010 the abatement costs of greenhouse gases through solar power station in reached 436 €/tonne of CO_2-eq, for geothermal energy production this was 132 €, biogas 102 €, biomass 96 €, wind 42 € and water only 36 €. The feed-in-tariff of solar electricity was 10,5 times higher in 2010 than the average market price of electricity production, while this ratio ranged between 1,9–3,9 for the rest of renewable sources of energy. Such ineffective subsidy scheme prioritizing one source of energy definitely does not represent the desired low carbon economy and green growth concept.

Another kind of problems connected to the realization of the subsidies for the solar electricity has to do with the law. Some of the cases of particular solar power plants have (almost) criminal context, including the unclear ownership of some sites, the influence of lobbyists, complaints against former Energy Regulatory Office officers, and involvement of the current ones (Česká tisková kancelář, 2013; Bardsley, 2013). Additionally, the 2010 retroactive tax "triggered threats of legal action from affected investors" (Radziwill, 2012, p. 18) and could cause future public expenditures due to lost legal cases.

There is generally lack of trust in the post-socialist countries and the problematic case of subsides for solar electricity production did not help to increase it. On the contrary, the relationship between the business and state, public and politicians (and state officers), and public and business was negatively affected. The idea of renewable energy production was almost discredited in the Czech Republic and many politicians (especially from the liberal government being in power during 2010–2013 period) attacked the ideas of renewable energy and environmental thinking as whole (Vávra, Lapka, & Cudlínová, in press).

5 Conclusions

The case study of the feed-in-tariffs subsidies for solar electricity production in the Czech Republic serves as an example of very problematic implementation of green growth strategy. The rapid boom of solar electricity linked with inappropriate legislation and governance (one can only ask whether this was a mistake or someone's intention) led to low economic efficiency of the subsidy scheme. While there definitely are the positive environmental outcomes (solar electricity is low carbon source of energy), the mismanaged realization and negative public and political perception can hinder future green growth strategies.

From an academic point of view, this paper is just a starting point for future research which should focus on the economic, environmental, economic-environmental, international and socio-political aspects. Possible future research questions could include some of these: How much do the subsidies really cost? What share is paid directly by the consumers and what share by state budget? Are the households, industry and state really economically harmed by the costs? How much greenhouse gas emissions were saved due to the solar electricity? Are there any negative land-use aspects of solar boom? What is the cost-efficiency of the solar electricity and the subsidies? How did other EU states manage the subsidies for solar electricity? How does public understand the ideas of renewable energy and green growth and was this understanding negatively affected by the recent events? How to implement future renewable energies more successfully in the post-socialist area? Some of these questions will be investigated in my future research.

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Analysis of CSR Reporting Practices of the Largest Companies Domiciled in the Czech Republic

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Abstract: *In this paper we analyze external corporate social responsibility (CSR) reporting by companies falling among the 50 largest (by sales volume) corporations domiciled in the Czech Republic and belonging to the selected industrial sectors. The findings show that only 7 of these 50 companies published a standalone CSR report with indicators computed primarily for their operations within the Czech Republic. Because we already published analysis of these standalone reports, in this paper we extend our analysis to the annual reports. The amount of CSR-relevant information provided in annual reports varies greatly. We found reports that do not contain nearly any CSR-relevant information as well as reports, which provide really comprehensive information. Nevertheless vast majority of annual reports does not provide much numeric CSR-relevant information as can be seen from our analysis of numeric indicators. The situation in the area of disclosure of non-numeric (narrative) information about sustainability issues in annual reports is much better - companies report about their initiatives in the areas of environment, social responsibility, and human resources management practices and also about received certificates, awards and codes of conduct.*

Key words: Corporate Social Responsibility Reporting · Corporate Sustainability Reporting · Environmental Accounting · Environmental Reporting · Global Reporting Initiative (GRI)

JEL Classification: M41

1 Introduction

Numerous authors nowadays claim that corporate social responsibility is increasing in importance, see e.g. (Roca & Searcy, 2012, p. 103) or (Roper & Parker, 2013, p. 2262). The appropriate corporate social responsibility (CSR) reporting (in this paper used interchangeably with term "corporate sustainability reporting"), which may be understood as a specific form of communication with stakeholders about the approach to the relevant issues, is often understood as one of the possible ways by which companies may improve their image and relationships with stakeholders by disclosing activities related to the sustainability issues.

Companies can publish their CSR reports as standalone reports, within annual reports, on web pages etc. Nowadays are of a high importance also trends toward "integrated reporting", see e.g. in (Ballou, Casey, Grenier & Heitger, 2012). We propose that the integrative approach to the reporting may be useful because it enables to address both financial and non-financial issues including intangible assets (Siska, 2013) in their interconnections and thus better describe their impact on a company's performance.

In this paper are shortly introduced three phases of our research project and consequently are in detail described the results of the project's first phase, which dealt with analysis of CSR external reporting practices of selected companies.

2 Literature review

2.1 Reporting on corporate social responsibility

Despite the fact that the standardization in the area of CSR reporting is in progress, there is neither a generally accepted definition of the term "CSR report", nor agreement about the content and extent of the information that should be disclosed in these reports.

A comprehensive review of literature on CSR reporting can be found e.g. in Fifka (2013) or in Roca & Searcy (2012). Trends in corporate sustainability reporting were analyzed in (Daizy, Sen & Das, 2013) as well as in (Patten & Zhao, 2014).

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2.2 Global Reporting Initiative Guidelines

Growing importance of reporting on corporate social responsibility goes hand in hand with increasing need for standardization of the content of CSR reports. The most comprehensive and widely accepted set of guidelines on CSR reporting is nowadays represented by the GRI (Global Reporting Initiative) Guidelines.[2]

The first draft of the GRI Guidelines was presented in 1997 and first guidelines (G1) were launched in June 2000 (Brown, Jong & Lessidrenska, 2009, p. 184). Since then GRI Guidelines achieved a great success and were adopted by numerous organizations. The GRI Guidelines are currently at version 4, which was released in May 2013, see (Global Reporting Initiative, 2013a) and (Global Reporting Initiative, 2013b). We propose that the important feature of these guidelines is their ability to develop and integrate with other sustainability approaches like various ISO standards, EMAS etc.

We conducted a bibliometric analysis of the literature dealing with GRI using ISI Web of Knowledge (WoK) to identify key articles, authors and topics. It is beyond the scope of this paper to present result of this analysis. Nevertheless it is possible to conclude that GRI success was reflected also by the attention that was given to the GRI in academic literature. In Web of Knowledge we in total we found 146 relevant papers published from 2003 to 2014. While in 2003 only two papers were published, in 2013 it was already 22 papers and in 2012 even 33 papers.

2.3 Global codes of business conduct

Corporations often refer to the utilization of various codes of business conduct. An overview of important global codes of business conduct can be found e.g. in (Cavanagh, 2004), nevertheless companies often develop their own codes.

2.4 ISO standards, EMAS and other CSR-relevant standards and certification systems

The most relevant ISO standard families from the viewpoint of sustainability are ISO 14000 – environmental management, ISO 26000 – social responsibility and ISO 20121 – sustainable events. Nevertheless important fact is that these standards are not “reporting standards”, i.e. external CSR reporting according these standards is not obligatory.

EMAS (Eco-Management and Audit Scheme) can be seen as an extension of ISO 14000 because ISO 14001 requirements are an integral part of EMAS;[3] from the viewpoint of reporting is EMAS more demanding than ISO 14000– external reporting on environmental issues is obligatory under this standard.

Another standard that is relevant from the viewpoint of increasing the quality in the area of social, environmental and economic performance is AA1000, which was released by the organization AccountAbility.[4] Standard SA8000 is aimed specifically at decent workplaces. Both these standards are addressed e.g. in (Beschorner & Muller, 2007).

OHSAS 18001[5] is an international occupational health and safety management system specification.

Last but not least, important certification system for sustainability and greenhouse gas emissions is also ISCC (International Sustainability and Carbon Certification).[6]

3 Methods

The research project “CSR Reporting in Central and Eastern European Countries” was prepared by the International Performance Research Institute (a non-profit research association founded in 2002 by Professor Péter Horváth) and we participate in this project by conducting research and providing data from the Czech Republic. The project is divided into 3 phases and its central objective is to determine the degree of development of CSR reporting in the selected countries. Methodologically are utilized both quantitative and qualitative and mixed research methods, specifically content analysis in the first phase, interview research in the second phase and finally a questionnaire in the third phase.

In the first phase of this project we conducted an analysis of published external reports. The main method used in this phase was content analysis.

In the second phase we performed interviews with two selected companies (one without external CSR reporting and the other one with high-quality external CSR reporting). The interviews strive to find out how companies understand sustainability, what is their motivation for dealing with sustainability and social responsibility, how they address these issues in the present and which changes are expected in the future.

[2] https://www.globalreporting.org
[3] http://ec.europa.eu/environment/emas/about/summary_en.htm
[4] http://www.accountability.org
[5] http://www.ohsas-18001-occupational-health-and-safety.com/what.htm
[6] http://www.iscc-system.org/en/iscc-system/about-iscc/

The third phase will be realized via questionnaire (empirical survey), which will strive to find additional information about issues related to CSR reporting.

In this paper are addressed only results of the first phase and we especially aim to determine in what form (annual report, standalone sustainability report, information on web pages) organizations publish information about sustainability issues, as well as the extent of such disclosures, and their thematic focus.

First, we shortly recapitulate our findings regarding standalone CSR reports. Second, we extend our content analysis to the annual reports of the 50 largest companies domiciled in the Czech Republic. Examined were companies from the industries classified in NACE Rev. 2 under C – manufacturing, D - Electricity, gas, steam and air conditioning supply, F - Construction, G - Wholesale and retail trade; repair of motor vehicles and motorcycles and J - Information and communication.

4 Research results

4.1 Collection of data and types of published reports

We utilized a ranking of the 100 largest companies domiciled in the Czech Republic "Czech top 100" (year 2012), which is available from (http://www.czechtop100.cz). From this database we obtained a basic information (number of employees, sales volume etc.) about the 50 largest companies, which fall under one of the industrial groups defined in chapter 3. Consequently we conducted a preliminary analysis of annual reports (year 2012), standalone CSR reports (the newest disposable report) and web pages of these companies to find CSR-relevant information, see Table 1.

Table 1 Location of CSR-relevant information

Characteristic	Number of companies	%
Annual report (or financial statements and notes) with at least minimal information on CSR topics	50	100
Annual report contains only minimal CSR-relevant information	15	30
Annual report contains CSR-relevant information over and above legal requirements	35	70
Standalone CSR report is available	8	16
Standalone CSR report with numeric indicators primarily for the Czech Republic is available	7	14
Information on CSR-relevant topics can be found on web pages	41	82

Source: own research

Consequently we compared basic characteristics of the whole sample (n=50) and of companies with standalone CSR report with numeric indicators primarily for the Czech Republic (n=7) and results can be found in Table 2.

Table 2 Comparison of the whole sample and its subset comprised of companies with standalone CSR report including indicators primarily for the Czech Republic (year = 2012)

Statistics	Characteristics of the whole sample (n=50)		Characteristics of companies with standalone CSR report (n=7)	
	Sales (thousands of CZK)	Number of full-time employees	Sales (thousands of CZK)	Number of full-time employees
Minimum	8,845,874	43	16,683,000	488
Maximum	262,649,000	31,359	262,649,000	31,359
Average	38,464,844	3,710	122,339,819	11,365
Standard deviation	51,797,588	5,959	90,854,038	11,994
Median	17,377,854	1,800	107,280,000	5,962
Skewness	2.9564	3.5562	0.3277	1.0973
Kurtosis	9.0357	13.9062	-1.8503	-0.8602

Source: <http://www.czechtop100.cz>, own calculations

4.2 A concise analysis of standalone CSR reports

In Table 1 we can see that only eight (i.e. 16%) of the companies provided standalone CSR report, which is quite low portion. For example Patten and Zhao (2014, p. 134) reported that the percentage of the largest 250 companies in the world issuing standalone CSR reports grew from 35% in 1999 to nearly 80% by 2008.

From Table 2 it is obvious that companies with the standalone CSR reports are on the average "larger" both from the viewpoint of sales volume and also from the viewpoint of the number of full-time employees.

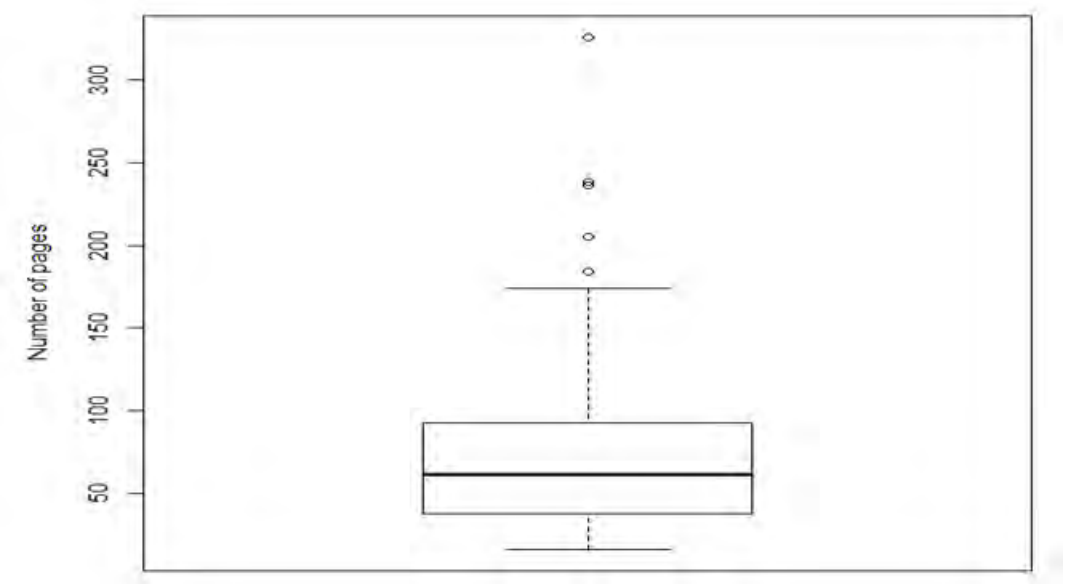
Analysis of length of standalone CSR reports showed that the number of pages of these reports varies from 23 to 111 with an average of 61.14 pages and standard deviation 28.76. The median length of these reports is 50 pages. Two reports were in accordance with GRI Guidelines (RWE Česká republika a.s.. ŠKODA AUTO a.s.), nevertheless report of RWE Česká republika a.s. was prepared at the level of a parent company and contained only two GRI performance indicators specifically calculated for the Czech Republic. Last, we analyzed the content of the standalone CSR reports to identify which indicators are reported; into account were taken only highlighted indicators (placed into tables or in figures). According to GRI Guidelines, 91 disclosed indicators belonged to the "environmental" category, 61 indicators belonged to the "economic" category, 40 indicators belonged to the category "labor practices and decent work", two indicators were from the category "society" and one indicator belonged to the category "human rights". For more detailed analysis of these standalone CSR reports see (Petera, Wagner, & Bouckova, 2014).

4.3 Characteristics of annual reports

Three companies published only financial statements and notes (comprising a summary of significant accounting policies and other explanatory information) and 47 companies published annual reports. In this paper we denote all 50 reports as "annual reports"; all these reports were audited.

Basic characteristics are reflected in the boxplot in Figure 1. An average number of pages of annual report (cover to cover) is 79.62, median amounts to 61.50, std. deviation is 63.48514, minimum is 16, maximum is 326, interquartile range is 58, first quartile is 37.50, third quartile is 95.50. Five reports were bilingual, their length was divided by two. Five outliers represent reports of exceptional length (ČEZ, a.s. – 326 pages, RWE Česká republika a.s. – 238 pages, Telefónica Czech Republic, a.s. – 236 pages, UNIPETROL, a.s. – 205 pages and ŠKODA AUTO a.s. – 184 pages).

Figure 1 Length-related characteristics of annual reports



Source: annual reports (n=50, year = 2012), own processing

4.4 Content analysis of annual reports

Content analysis was applied on all parts of annual reports excluding financial statements. First, we were looking for letter from CEO (or a similar document) and if the letter was included in the annual report, we evaluated whether in this letter are at least mentioned some CSR topics. Our analysis showed that the letter was included in 31 annual reports and CSR topics were mentioned in 20 of these letters. Second, we conducted an analysis of disclosed numeric indicators and used GRI G4 as a framework for their classification into GRI categories. Aggregated results can be found in Table 3.

From Table 3 it is obvious that at least one of the indicators belonging to the "EC - Economic" category was reported by all 50 companies. This is an expected result, because in annual report have to be at least indicators "EC1 - direct economic value generated and distributed". At least one of the indicators belonging to the "EN - environmental" category was reported by 11 companies, that is 22% of companies. Seemingly, a lot companies (49) reported indicators from category "LA – labor practices and decent work", but it is only because of indicator G4-10, which relates to the total number of employees (for purposes of this study placed under labor indicators) and was (at least partially) reported by 49 companies. If we excluded this indicator, only 10 reports would include indicators from the category "LA". Specifically, indicator "LA 6 - Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total

number of work related fatalities, by region and by gender" was disclosed in seven annual reports and indicator "LA 9 - Average hours of training per year per employee by gender, and by employee category" was disclosed in six annual reports. Finally, indicators from category "SO – Society" were reported only in 3 annual reports.

Table 3 Reported numeric indicators (classification according to GRI G4)

Category of indicator	**Number of annual reports in which is included given type of indicator**
EC – Economic	50
EN – Environmental	11
Social	
LA – Labor practices and decent work	49
HR – Human rights	0
SO – Society	3
PR – Product responsibility	0

Source: annual reports (n=50, year = 2012), own research

Third, we released our demands regarding numeric data and aimed our attention at the disclosure of any CSR-relevant information. An overview of results can be found in Table 4. Encouraging is high degree of cooperation with universities and other educational organizations (mainly in areas of research and preparation of possible employees). Seven companies mentioned also "educational" activities in the area of their business activities. For example AHOLD Czech Republic, a.s. provided some education in the area of "healthy lifestyle" and Telefónica Czech Republic, a.s. introduced initiative for safer internet.

Table 4 Main CSR-relevant topics discussed in annual reports

Topic	**Number of reports in which is topic discussed**
Environment	31
Health and safety	18
Education and training of employees	25
Social responsibility, specifically	28
Education	7
Charity, donations etc.	21
Voluntary work	6
Cooperation with universities and other schools	19

Source: annual reports (n=50, year = 2012), own research

Fourth, we aimed our attention at ISO and other sustainability-relevant standards and in Table 5 can be found information about number of reports that mention these standards.

Table 5 Standards mentioned in three or more annual reports

Standard (family of standards)	**Number of companies that mention standard in their annual report**	**Description**
ISO 14000	27	environmental management
ISO 9001	14	quality management
OHSAS 18001	12	occupational health and safety management system
EMAS	3	extension of ISO 14000

Source: annual reports (n=50, year = 2012), own research

In addition to the standards depicted in Table 5 were also mentioned (in less than 3 reports) standards SA 8000, ISO TS 16949, ISO 27000, Responsible Care (RC), REACH, ČSN EN 16001:1010 and ISCC – International Sustainability and Carbon Certification.

As for management approaches, next to risk management and quality management were often mentioned some more specific approaches, especially lean management (mentioned in 6 annual reports).

From the viewpoint of CSR is important utilization of various codices. With regard to global codes of business conduct, we found that the UN Global Compact was mentioned in two annual reports. In one report were mentioned also ICC Anti-corruption Clause Corporate governance codex and CoST (Construction Sector Transparency Initiative). Once mentioned was also Electronic lndustry Code of Conduct. Company-based codices were under different names ("ethical codex", "Our Business Principles" etc.) mentioned in nine reports. In eight reports was mentioned utilization of "corporate governance codex".

Last but not least, membership in CSR-relevant organizations was mentioned in three annual reports - membership in Czech Donor Forum (AHOLD Czech Republic, a.s.), Business Leaders Forum (Skanska a.s.) and Coalition for Transparent Business (O2 Czech Republic a.s.).

5 Discussion and conclusions

In this paper we introduced three phases of our research project, which is aimed at analysis of quality and quantity of corporate sustainability reporting among the largest companies domiciled in the Czech Republic. Consequently we presented results of the first phase, which consisted mainly of the content analysis of annual and standalone reports.

With regard to standalone CSR reports, our research showed that they were published by eight companies in our sample. Two of these reports contain only few indicators relevant for the Czech Republic (one of these reports does not contain any such indicator and the other one contains two indicators). From the remaining six reports is in accordance with GRI Guidelines only one report (ŠKODA AUTO a.s.). It seems to us that the major imperfection of the published standalone CSR reports is their incompleteness, i.e. selective disclosure of indicators, which is in contrast with requirements of GRI guidelines (Global Reporting Initiative, 2013a, p.16-18) on the application of the principles of sustainability context, materiality, completeness, balance, comparability, accuracy, timeliness, clarity and reliability.

In regard to annual reports, our research showed that both their length and the amount of CSR-relevant information in these reports varies greatly. There are three reports, which could be labeled as "integrated reports" (i.e. annual reports by ŠKODA AUTO a.s., ČEZ, a.s. and RWE Česká republika a.s.; moreover these companies publish also standalone CSR reports). On the other hand, 15 companies published annual reports which include only minimal CSR-relevant information. It is fair to notice that majority (i.e. 11) of these 15 companies provide CSR-relevant information at least on their web pages. The remaining 32 annual reports provides at least some information about sustainability issues.

Content analysis of these 50 annual reports revealed that in regard to CSR reporting is disclosed mainly narrative information. Especially often are discussed topics of environmental responsibility, health and safety, education of employees and social responsibility. In the area of social responsibility companies most often report about charity, donations, philanthropy etc. Less often are described kinds of interaction with stakeholders, which require higher involvement of company's employees and managers. Voluntary work (e.g. for non-profit organizations) is mentioned only in six reports and educational activities in seven reports. On the other hand, we were surprised by high degree of reported interaction with universities and other educational organizations. Numeric information about economic issues is obligatory in annual reports and therefore it is not surprising that this information is included in all analyzed reports. Disclosure and standardization of numerical indicators from areas of environment and social responsibility is relatively weak. Investigation into reasons why companies do not strive to improve their CSR reporting in the area of standardization of disclosure of CSR-relevant information is possible topic for the further investigation.

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Preferential Votes in Municipal Elections and the Possibility of their Analytical Use in the Study of Voting Behaviour

Radek Kopřiva, Sylvie Kotásková[1]

Abstract*: The article deals with the appointment of municipal councils in the Czech Republic as one of the key elements of endogenous regional development. The electoral system applied in municipal elections has a number of internal elements that lead to a relatively high degree of disproportionality between votes expressing the interests of voters and the elected representative body, and they also prevent easy detection of the nature of the voting behaviour of the electorate. One of the few ways to assess electoral behaviour is to analyse the variance of electoral votes needed in order to understand how the vote takes place. In the case of the administrative district of Vodňany, the purpose is to find out what the prevailing method of voting is in the electoral behaviour, and how important are the deformation effects of the applied electoral system in comparison with the interests of the voters.*

Key words: Electoral System · Municipal Board · Municipal Elections · Electoral Behavior · Preferential Vote · Vodňany

JEL Classification: D72 · H83 · J18

1 Introduction

The nature of staffing representative bodies at sub-national levels of political decision-making can certainly be considered one of the key factors of regional development. In this context, it makes sense to pay attention to the basic method of the appointment of the basic elected local government bodies, not only in terms of the voting behaviour of the electorate, but also of the voting - electoral system mechanism itself.

In the past, several works were devoted to the issue of the voting behaviour of the electorate in local elections in the Czech political environment. Most of them were based on an analysis of preferential votes received by individual candidates. One way to understand the reasons for the electoral decision is to study the inclination of voters toward candidates based on their personal characteristics. Voting behaviour is to a certain extent influenced (in particular by voters with a low level of awareness) by elementary information regarding the personal characteristics of the candidates. These may serve voters as helpful criteria for their electoral decisions. The candidacy of the candidate for a political party plays a role in municipal elections in the Czech Republic (Bernard 2012). In small towns (up to three thousand inhabitants), candidates seeking a mandate from an independent list of candidates have the greatest chance to be elected. In large cities (more than 50,000 inhabitants), the most successful candidates are those of parliamentary parties. In the middle category of municipalities, are joint independent list of candidates are still the most successful, but only slightly more so than the candidates from the lists of political parties. Simply put, during municipal council elections the importance of candidates of political parties is increasing with the growth of the municipality, and the importance of independent candidates running on joint independent lists is increasing with a decrease in the size of the municipality (Bernard 2012).

In addition to party affiliation, Bernard also focused in the characteristics of gender, age, incumbency and political affiliation. The characteristics of gender, age and political affiliation (whether a candidate is or is not a member of a political party) do not play an essential role in voters' decisions; the remaining characteristics are significant in this regard. A greater inclination of voters to support electoral candidates who obtained university degrees was demonstrated. An important criterion for electoral decision-making is incumbency[2]. Electing a candidate from unelectable section of the candidate sheets[3] is not very likely, which also applies for various size categories of municipalities. Adversely, it applies that the previous holding of political office will likely lead to a mandate being

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[2] The concept of incumbency is usually used in connection with the so-called incumbency effect. This means advantages for candidates elected in the past to a political congregation in filling positions on candidate lists.

[3] A unelectable section of a candidate sheet means a position on the sheet that does not lead to a mandate being obtained by a candidate, unless it is moved to the higher levels of the list.

obtained (Bernard 2012). Nevertheless, the importance of preferential votes cannot be completely ignored. In addition to contributing to the re-election of former representatives, preferential votes also have staffed-stabilizing effects. They often contribute to the re-election of candidates who were previously members of the municipal council and are now seeking a representative mandate from an unelectable section of the list (Šedo 2009; Balík 2009; Balík 2012). Preferential votes for candidates of parties were also used in analytical works focused on the estimation of the used voting technique in municipal elections. It turned out that in small municipalities there is a predominant tendency to support more candidates from different lists, whereas in larger municipalities the constituency prefers to elects entire lists of parties (Kopřiva 2012).

However, the conclusions of the work, which are based on an analysis of the results of municipal elections built on preferential votes, suffer from a certain degree of distortion. This stems from the nature of the applied electoral system. The election system which is used to establish municipal councils in the Czech Republic is characterized by considerable freedom with which voters can vote for candidates. During an election, an open list of candidates allows voters to prioritize candidates from different lists within the limit of mandates distributed in the constituency, or to support one list of a candidate party with all of the available votes. A third possibility is the possibility to combine the two previous alternatives. In such a case voters can often use some of the votes for candidates from several lists of candidates, and then use the remaining votes to support one party list of candidates. When looking at the election results, however, it is not clear how many votes obtained by a candidate can be considered as “direct,” how many votes meant that he/she was a preferred candidate and how many they earned as a member of the list of candidates (party support).

There are not many works devoted to the municipal electoral system and its effects in the Czech Republic. In the past, Outlý (2003) devoted work to the normative development of the election system, and characteristics of the specificity of the electoral system were the result of the work of Lebeda. The municipal system is intrinsically complex and difficult to understand from the perspective of voters. The system leads to a high degree of disproportionality, in particular in the case of transformation of votes into mandates for individual candidates. The system often favours candidates with little voter support, and earning the largest number of electoral votes may not lead to acquiring a mandate. In addition, this controversy is not known to voters (Lebeda 2009). As a result, it is difficult to draw conclusions about voting behaviour when analysing mandates obtained by the candidates of different lists of political entities.

One of the few analytical possibilities given by work with preferential votes in local elections - and on its basis, to be able to relevantly judge the nature of voting behaviour – comes from the description of the method of voting. As mentioned above, the voter has the opportunity to vote in three ways. Of course, the nature of voting behaviour cannot be deduced from the very manner in which elections take place. From the comparison of the voting method in the context of the type of elected bodies, we can after all accept some indicative conclusions. Understanding voting methods in the context of the elected party can be a starting point for further analytical work.

2 Methods

This article aims to assess the applicability of preferential votes for candidates who are running for political mandates in municipal council elections in the Czech Republic when describing voting methods. The work is created based on data from the Czech Statistical Office. Specifically, it relates to election results in the municipal elections in 2014 (mainly in the form of preferential votes for candidates) in the municipalities of the administrative district of Vodňany (available at www.volby.cz). The data are processed analytically via simple statistical methods (coefficient of variation), and are subsequently mutually compared.

The municipalities of the administrative district of Vodňany were chosen deliberately. This is a set of municipalities that are intrinsically heterogeneous in terms of the size of individual elements. The administrative district Vodňany is located in the South Bohemian Region in the District of Strakonice. The administrative district has a total of 16 municipalities.

3 Analytical part

As stated above according to Lebeda, the majority of voters are not able to imagine the consequences of the effects of the municipal electoral system, and in the context of elections, they do not subordinate election strategy to the electoral system. It can thus be considered that the electorate prefers candidates from lists with the hope that the relevant vote will increase the likelihood of their election. This of course applies provided that the voter uses preferential votes and

selects different candidates from different lists of candidates within elections. Voters, however, can also prioritize the entire party list, but the voting method cannot be read from the election results. It is not clear from the total number of votes that a candidate won which of them stem from the support of a party, and those in which the candidate was preferred as an individual. However, the predominant technique of the election can be indirectly derived from the results. If there is significant variance of preferential votes of the candidates in comparison with the average votes per candidate on the electoral lists, it is clear that the electorate increasingly used of preferential votes in the selection of the relevant party. In comparison with this, it is also clear that a small variance of the number preferential votes for individual candidates compared to the average is caused by increased support for the party as a whole.

If voters tend to support the entire party list, they do not consider what personnel representation the party will have in the elected ward. From the voter's point of view, the decisive factor is the relative size of party. Under such circumstances, the normatively-grounded effects of the electoral system are not a problem for voters. However, if the voter selects candidates from different lists and combines them, they expect that preferential votes will be a criterion for selecting representatives. In this case, the election system may somewhat transform the interests of the voter. The electoral system is set up so that the mandates for the party are not primarily distributed to candidates according to the number of preferential votes, but rather according to the order on the list. In order to be able to move to an electable spot on a list, it is necessary that the candidate gains at least 10% more of the vote from the unelectable spot compared to the average for one candidate on the list.

For municipal elections, which took place in the municipalities of the administrative district of Vodňany in 2014, the rates of use of preferential votes can be derived from the calculation of the coefficients of variation of preferential votes for individual candidates and parties. Their value is displayed in Table 1a, 1b.

Table 1a Coefficient of variation – elections to local council 2014

Bavorov	**ČSSD**	**KSČM**	**Sdružení Bavorov**	**SNK Evr. Demokraté**
	5	3	5	2
Coefficient of variation	0.23	0.44	0.2	0.38
Bílsko	**Pro Bílsko**			
	7			
Coefficient of variation	0.24			
Budyně	**SNK Budyně**			
	5			
Coefficient of variation	0.38			
Čížčenice	**Nezávislí Čížčenice**			
	7			
Coefficient of variation	0.37			
Drahonice	SNK			
	9			
Coefficient of variation	0.08			
Hájek - can not calculate coefficients of variation of reasons candidacy only independent candidates				
6 candidates (independent), allocate 5 seats				
Chelčice - can not calculate coefficients of variation of reasons candidacy only independent candidates				
14 candidates (independent), allocate 7 seats				
Krajníčko - can not calculate coefficients of variation of reasons candidacy only independent candidates				
10 candidates (independent), allocate 7 seats				
Krašlovice	**KDU-ČSL**			
	7			
Coefficient of variation	0.27			

Source: Own calculation based on electoral data of the Czech Statistical Office

Table 1b Coefficient of variation – elections to local council 2014

Libějovice	**Libějovice 1**	**Libějovice 2**
	5	2
Coefficient of variation	0.24	0.22
Měkynec - can not calculate coefficients of variation of reasons candidacy only independent candidates		
6 candidates (independent), allocate 5 seats		

Pivkovice	**Nezávislí**
	7
Coefficient of variation	0.41

Pohorovice	**SNK Pohorovice**
	7
Coefficient of variation	0.28

Skočice	**KDU-ČSL**	**Lidmovice**
	5	2
Coefficient of variation	0.4	0.3

Stožice	**SNK 1**	**SNK 2**	**SNK 3**	**SNK Stožice**
	4	2	1	2
Coefficient of variation	0.51	0.85	0.86	0.14

Truskovice	**Strana za zkrášlení obce**
	7
Coefficient of variation	0.38

Vodňany	**ČSSD**	**KSČM**	**ODS**	**SNK 1**	**SNK 2**	**Vodňany pro změnu**	**Vodňany 2022**
	1	1	2	8	1	4	4
Coefficient of variation	0.38	0.23	0.11	0.09	0.46	0.09	0.17

Source: Own calculation based on electoral data of the Czech Statistical Office

The values of coefficients of variation up to 0.2 show a low rate of dispersal of preferential votes for individual candidates compared to the average value of votes per candidate on the list. In the municipalities of the administrative district Vodňany, 27 political entities competed for electoral votes with more candidates on the list. A low value of the coefficient of variation (up to 0.2 inclusive) was found in five candidate lists. It is thus clear that the electoral support of most political entities is mainly based on selecting candidates from different lists and combining them. An exception are the five mentioned lists, where it is very likely that the party received the majority of the votes thanks to the support of the entire party list.

If the coefficient of variation is higher than 0.2, this usually shows that the amount of preferential votes for the best candidate is more than double compared with the least successful candidate. Support of the party ballot clearly arises from less than half by the vote for the entire party list. Yet there may be more voters marking different candidates of parties, as only a few give preferential votes to the party.

For parties for which the calculated coefficient of variation from preferential votes for its candidates reached values higher than 0.3, there can be no doubt that the greater part of the election acquisition of the party comes from voters selecting candidates from different lists and combining them. In the overall view of election results according to the number of preferential votes for candidates, it is possible to definitively state that the election outcome for a party is primarily determined by support for its individual candidates, and not the entire party lists.

Yet the question remains what the relationship is between the form of voting voters in view of the nature of the elected political entities and the political environment. Of the five monitored municipalities in which ran more than one political entity list (single candidate lists are not taken into account), it applies in four cases that the party with the largest electoral support has the least amount of scattered preferential votes relative to the average value. Yet it is not

possible to see from the results of coefficients of variation that the in municipalities with the most pluralistic political environment (at least judging by the number of running parties) the most successful running parties achieved the lowest values of coefficients of variation. From the municipalities in the sample in which at least four electoral parties ran, the winning political entity achieves a low coefficient of variation values only in one case. This is the largest municipality in the sample: Vodňany. In this case, low or average values of coefficient of variation are also achieved by other parties that were successful in the elections and won at least one political mandate. Yet this is not easy to understand. This is a municipality that in terms of the size of its population (less than seven thousand), can be perceived, under Czech conditions as moderately-large. For municipalities of this size, it can be expected that some of the electorate does not consistently follow the local political process, does not know most of the candidates, and, during elections, decisions are made on the basis of knowledge of the political entity, not the candidates. In their voting behaviour they tend to support the entire list of the political party. A relevant conclusion, however, can be formed only on the basis of studying a larger number of medium-sized and large cities in the Czech Republic. All other municipalities, including those where at least four electoral bodies ran (Bavorov, Stožice) can be considered so small that the vast majority of the electorate knows the local political environment, and in the election they usually select candidates rather than supporting the entire political party list. For electoral bodies for which the coefficient of variation value was calculated at a low level (0.2), we only see two such cases in the small municipalities of the administrative district Vodňany - one in a municipality where only a single entity ran with a number of candidates equal to the number of council members, and in view of the logic of the electoral system, it makes no sense to prefer candidates.

The above can be summarized that in the municipalities of the administrative district of Vodňany, the majority of voters vote through preferential votes for selected candidates from different lists of running political parties. The basic question remains whether their vote is reflected in the composition of the councils of the municipalities. As mentioned above, the electoral system applied in selecting municipal councils in the Czech Republic has considerably reductive effects in relation to candidates from the lower levels of candidate lists. Candidates for elective positions are favoured in comparison to them in that they obtain the mandates given to a party in the event that some of the candidates in an unelectable spot do not obtain at least ten percent more votes than the average number of votes per candidate on the list. By analysing the distribution of mandates to candidates of various political parties in the municipalities of the administrative district Vodňany, we can see that a significant majority of the elected representatives received a mandate from the electable spots on the lists. Of the 27 monitored entities, 23 of them achieved only minor shifts on the list of candidates, or there were no shifts at all. This number is significant, given the proven fact that the electorate in these municipalities in most cases tends to prefer candidates at the expense of electoral support for entire party lists. On the basis of this fact, it can be concluded that there is a very high level of disproportionality in the municipal electoral system. A detailed analytical perspective also shows that most of the elected candidates not only come from the top spots of candidate lists, but also that in most cases they are former, and thus re-elected candidates – i.e. the so-called incumbency effect. On the basis of these results, we can conclude that the composition of the municipal councils is not the result of mere wishes and the voting behaviour of the electorate. In this respect, nomination meeting of party organizations, during which their lists of candidates are compiled, play an important - perhaps the most important - role.

4 Conclusions

The municipal electoral system has reductive effects in the Czech Republic. It favours candidates who run from electable spots on lists, compared to candidates from unelectable spots, despite the fact that it gives voters relatively significant freedom in electing candidates. A voter has (among other things), the possibility of giving preferential votes to individual candidates, as many as there are mandates distributed in the relevant constituency. The analysis of preferential votes of the municipalities of the administrative district of Vodňany shows that the majority of voters use preferential votes. In the file monitored municipalities, we cannot find many running political parties for which it would be possible to assume that their electoral support arises primarily on the basis of support of the entire party list. Those who this concerns run in larges municipality in the monitored set - Vodňany. Although in municipal elections the preferences candidates are expanded through voting, the elected councillors usually receive their mandate due to their position on the electable spot on the party candidate lists.

It appears that working with preferential votes can be useful, despite certain limitations that stem from the lack of information on how particular voters vote. Based on the work with preferential votes, we can assess the manner in which voters vote for the given entities in the majority of cases. This knowledge can provide information about the impact of, for example, the size of the municipality or nature of the local political environment on voting behaviour.

The conclusions acquired from analysing preferential votes in the municipalities of the administrative district Vodňany must of course be received with some caution. This represents a relatively small number of municipalities, which are also located in the same area of the Czech Republic. An analysis of a representative sample of Czech municipalities may, however, provide valuable insights about the voting behaviour of the electorate in the local council elections.

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Economic Effects in Slovakia within Integration in the European Union

Amir Imeri, Zuzana Bajusová[1]

Abstract*: The wide interest, application and membership of Slovakia in European Union enable to study the economic effects in general terms. In our study we are going to analyze the economic cooperation of Slovakia before and after membership in EU. We will discuss whether economic cooperation between Slovakia and EU members increased or decreased after EU membership. This article provides a comprehensive and contemporary comparative analysis of the economic performance, the economic structure and the trade relations between Slovakia and EU countries, allowing us to detect basic trends and developments. We will compare the economic performance of Slovakia and other EU members (including Czech Republic and Slovenia), looking at aggregate figures from integration in EU such as foreign trade, FDI, GDP and its structure, level of structural unemployment and employment, inflation and level of income.*

Key words: EU Membership · Foreign Trade · FDI · GDP · Unemployment · Inflation

JEL Classification: F4 · F14

1 Introduction

The idea of peace and stability of a united Europe was the dream of philosophers and visionaries. On the ruins of World War II grows into the forefront the effort to create a new structure of Western Europe, based on common interests, based on treaties guaranteeing the rule of law and equality between all countries.

Basis for the future unification of Europe was laid on 9th of May 1950 by French Minister of Foreign Affairs Robert Schuman and economist Jean Monnet. They developed a plan of the European Coal and Steel Community, known as the Schuman Plan or Plan ECSC Treaty. This proposal was unanimously welcomed by Germany, Italy, the Netherlands, Belgium and Luxembourg. These countries, together with France were founding members of the European Coal and Steel Community, which preceded the European Economic Community (EEC) and the European Union today.

One of the most important products of the integration processes is a common internal European Union market. Towards the creation were concluded agreements, treaties and pacts and such developed through debates and economic integration to the form in which we know it nowadays. Not ideal and it is not in final form yet but its existence for us appears to be justified.

2 Methods

The main objective of the paper is assessment of the level of development of Slovakia within the European Union integration. The methodology in this paper does not use any structural model, but we used available information, databases and publications to compare the stage of development of economic indicators such as Gross Domestic Product per capita (GDP p.c.), unemployment rate, inflation and gross average monthly wage in Slovak Republic within its integration in the European Union. In order to better study the economic growth of Slovakia we analyzed several macroeconomic indicators such as the level of unemployment and risk of poverty. The implementation of comparison of chosen indicators with other countries as Czech Republic and Slovenia are given to get better overview of the issue.

Source data are drawn from the statistical database of the European Union (EUROSTAT), the Ministry of Agriculture of the Slovak Republic, and Statistical Office of the Slovak Republic. Paper is providing a synthesis of the available sources and for better illustration and clarity will be used rendering methods.

3 Research Results

3.1 Accession of the Slovak Republic in the EU

The first steps towards independence for Slovakia were the first democratic elections for the federal parliament of the former Czechoslovakia by Czech National Council and the Slovak National Council, on 08-09 June 1992. The elections

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gave the possibility to choose two prime ministers, each in their republic, one for Slovakia, and the other for Czech Republic. Disagreements between the republics were intensified and it became clear that the previous federation may not survive. Slovakia was more interested in independence, because in July 1992, declared a sovereign state.

First diplomatic relations between the European Union (at that time called the European Community and the former Republic of Czechoslovakia was established in September 1988. The first agreement between them was the four-year deal for trade in industrial products, which entered into force in April 1989.

European Community signed another agreement with Czechoslovakia in 1991, called the "European Agreement". This agreement was not only for free trade but regulated many areas of economic and political cooperation. The provisions were similar to the members of the European Union in the first phase (1958-1961). This new agreement replaced the former agreement in 1989, but not entered into force, since Czechoslovakia split into two new republics, the Czech Republic and Slovak Republic and had to be made two new agreements with the European Community.

The "European Agreement" with the Slovak Republic was signed on 4 October 1993 and entered into force on 1 February 1995. This new agreement, added new relationships, such as, cultural and financial cooperation and formulated the overall goal for full membership in EU. Full free trade of goods had to be done during the 10-year period.

Slovakia submitted a formal request for accession to the European Union on 27th June 1995. Two years later, the European Commission published its opinion on the application for membership of Slovakia. European Commission (1997) stated: "Slovakia doesn’t have stable institutions, fundamentally lacks in political life".

The Accession Partnership since 1998 was supported by financial assistance through instruments: PHARE, ISPA and SAPARD. From PHARE program (The Programme of Community aid to the countries of Central and Eastern Europe) funded a variety of projects in support of minorities, the functioning of the courts, control of migration, Small and medium Enterprises (SMEs), Non Governmental Organisations (NGOs), privatization of banks and cross-border cooperation, with a total amount of 570 million Euros.

From ISPA (The Instrument for Structural Policies for Pre-Accession) instrument was financed highway section D61 in Bratislava, modernized three rail sections and more sewers were built or reconstructed with a total amount of 55 million Euros per year. SAPARD (Special accession programme for agriculture and rural development) was agricultural assistance, implemented in Slovakia in 2002, with amount of 18.6 million Euros a year.

According to European Commission (1998) the first publication of the Progress Report of Commission was on 4 November 1998, for all candidates from Central and Eastern Europe. At the report were provided positive assessments of Slovakia for the good organization of the parliamentary elections and the implementation of most of the reforms necessary for the establishment of functioning market economy. Due to changes implemented in 1998, Slovakia has met the Copenhagen political criteria. The Council decided to begin accession negotiations with Slovakia in February 2000.

The fifth and final publication of the Progress Report was released on 9 October 2002. As the European Commission (2002) mentioned European Council meeting in Copenhagen in December 2002 were officially closed the accession negotiations with Slovakia and nine other candidate countries.

The European Parliament has approved the expansion of the EU on 9 April 2003 and the accession treaty was signed on 16 April 2003 during a meeting of the European Council in Athens. The Slovak Parliament approved the agreement on 1 July 2003, by that Slovakia became a full member of the EU on 1 May 2004.

3.2 Economic effects in foreign trade of Slovakia after EU integration

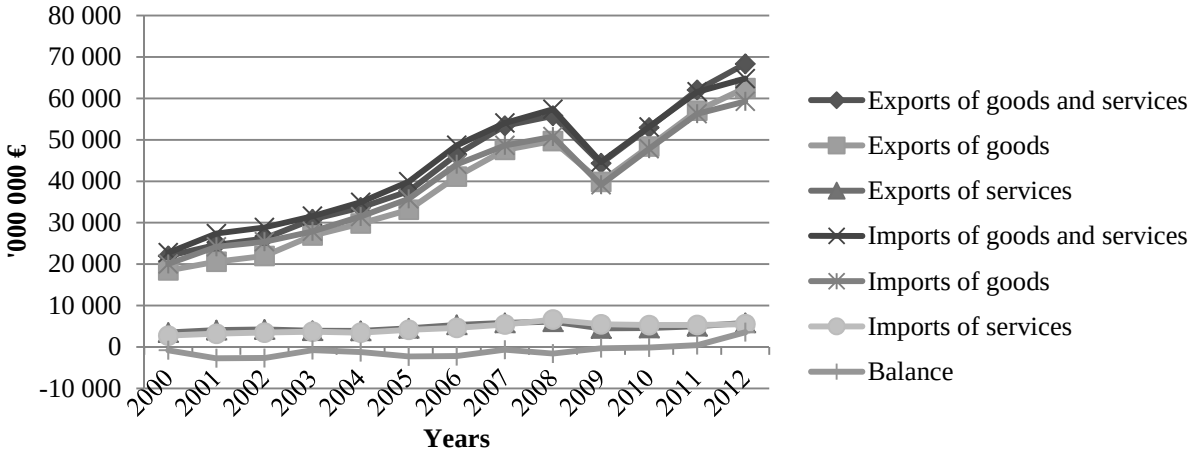
Slovakia's accession negotiations to the EU had a great impact on the growth of foreign trade. Even before joining the EU, the largest foreign partners were members of the EU. In 2012, the main export partners of Slovak goods were members of the EU with 84%, as follows: Germany 21.3%, Czech Republic 14%, Poland 8%, Hungary 7.2%, France 5.4%, Austria 6.7%, Italy 4.6% UK 3.9%. The main exported products in 2010 were: machinery and transport equipment (56%), raw materials (22%) and chemicals (3%).

On the other hand, in 2012, mainly also imported from members of the EU, with 64%, as follows: Germany 16.6%, Poland 3.6%, Czech Republic 9.6%, Austria 2.3%, Hungary 3.6%, Italy 3%, and Russian Federation 9.9%, South Korea 9.4%, China 6.2%, and in 2010 the mainly was imported: machinery and transport equipment (43%), raw materials (20%) and chemicals (6%).

Exports of goods and services from 2000 to 2012, was growing continuously, except in 2009 when the crisis began in the EU, dropped by about 20%. Slovakia registered the highest value for its exported goods and services in her history in 2012, 68.3 billion euro. The growth of exports of goods and services from 2000 to 2012 was 311%. As the exports of goods and services was growing for these 12 years, constantly was growing imports of goods and services, except in 2009, when it fell by about 22%. Highest value of imports of goods and services, Slovakia has registered in 2012, 64.8 billion euro.

For the Slovak foreign trade it's important that these last two years, actually for 2011 and 2012 is in surplus, and the record reached in 2012, with 3.5 billion euro. The share of goods and services, in exports and imports, is much higher in goods, with more than 91% in 2012, see Figure 1.

Figure 1 Export and import of goods and services of Slovakia from 2000 to 2012 (in millions of euros)



Source: Statistical Office of the Slovak Republic (2013)

3.3 Foreign direct investment, GDP and its structure in Slovakia

In Slovakia, the development of the economy was achieved during the last twelve years. The membership in EU, NATO (North Atlantic treaty Organization) and OECD (Organisation for Economic Co-operation and Development) heavily affected the continuity of the increase in foreign direct investments and the growth of real GDP in Slovakia.

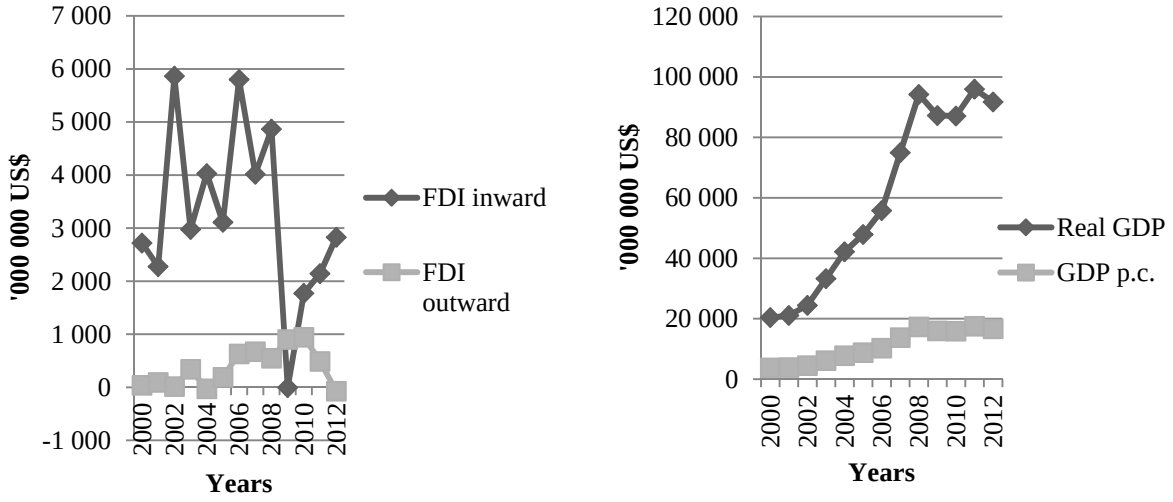
Figure 2 points that foreign direct investments in Slovakia, starting in 2000 to 2012 grew by about 200%. The highest value of FDI (Foreign Direct Investment) in Slovakia was achieved in 2006, 5.8 billion U.S. dollars, and lowest when the crisis started in the EU actually were negative with minus 6 million U.S. dollars. The FDI of Slovak companies that invested in other countries was highest in 2010, 946 million US$ and negative in 2012, minus 73 million US$.

Real GDP was around 20 billion US$ in 2000, and has grown to four and a half times compared to 2012, 92 billion US$. The highest value of GDP was achieved in 2011, 96 billion US$. GDP per capita grew by four and half times, from US$ 3,775 in 2000 to 16,738 US$ in 2012, and the highest value was reached in 2011 with 17,545 US$.

The share of FDI in GDP was very low before EU membership, and then in 2002 with 24% became the highest. FDI as a percentage of GDP of Slovak companies in other states were highest in 2006, about 1.1%. Overall, FDI were in the automotive sector, electronics, chemistry, metallurgy and processing of metals, rubber, plastics and machinery. Slovakia's comparative advantage in attracting foreign capital was excellent geostrategic position and the tax system. Moreover, the advantage of Slovakia is considered its cost-effective and well skilled workforce and proximity to European markets.

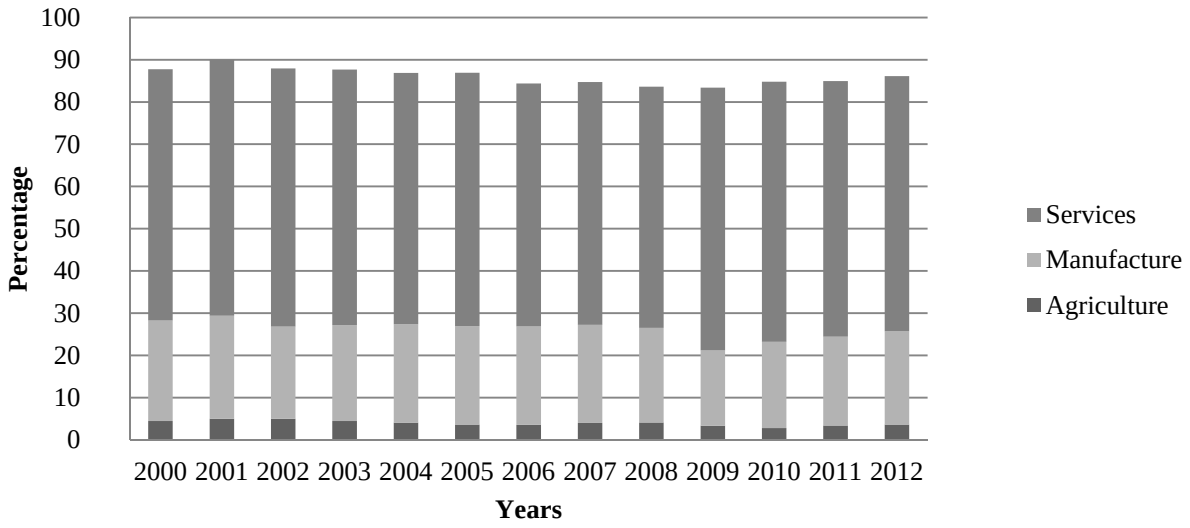
It is notable that the major investments have been made in research and development, design and innovation, technological centers, information and communication technologies and software development, outsourcing - regionally based, high technology and tourism centers. The main investors in Slovakia are from USA, Germany, Japan, Korea, France, Spain and the Netherlands. Also it is significant that the manufacturing sector has an important role in the economy of Slovakia. Long tradition in the production, along with relatively low labor costs and raw materials, explains the large inflows of foreign direct investment. The share of agriculture in GDP decreased from 4.46% in 2000, to 3.63% in 2012.

Figure 2 FDI and GDP in Slovakia during 2000-2012 (in millions of US$ and per capita)



Source: UNCTAD (2013)

Figure 3 Structure of GDP in Slovakia from 2000 to 2012 (in %)

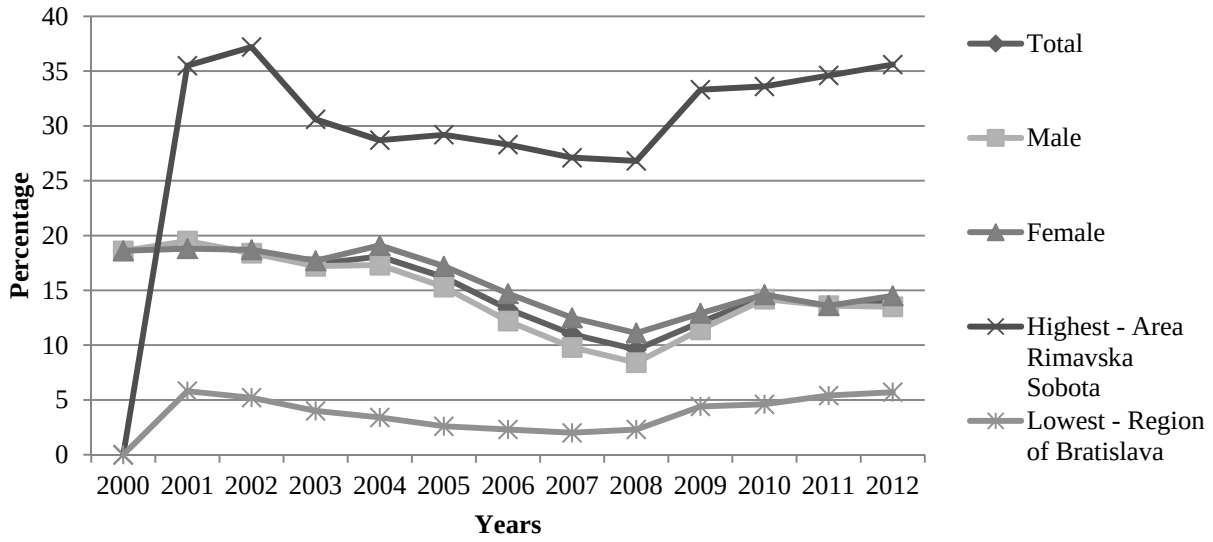


Source: Statistical Office of the Slovak Republic (2013)

3.4 Level of structural unemployment and employment in Slovakia

The unemployment rate in Slovakia was twice higher than in the Czech Republic and also much higher than in Slovenia for the period from 2000 to 2012. The highest unemployment rate was registered in 2001, 19.2%, and the lowest after joining the EU, in fact in 2009, 9.6%. The number of unemployed in 2012 was the highest in last eight years, in fact since 2006 when it reached 16.2%. Rising unemployment in Slovakia was caused by the global financial and economic crisis that hit the country in 2008, and the recession in the Eurozone and the weakening of economic growth of Germany in 2012, which means moderately slow growth of foreign demand, considering that 85% of Slovak production ends in Eurozone countries. In this regard were the measures adopted by the Slovak government, for example increase in direct taxes, income taxes and tightening of the Labour Law which have the greatest impact on the creation of new jobs.

Figure 4 Level of unemployment in Slovakia from 2000 to 2012 (in %)

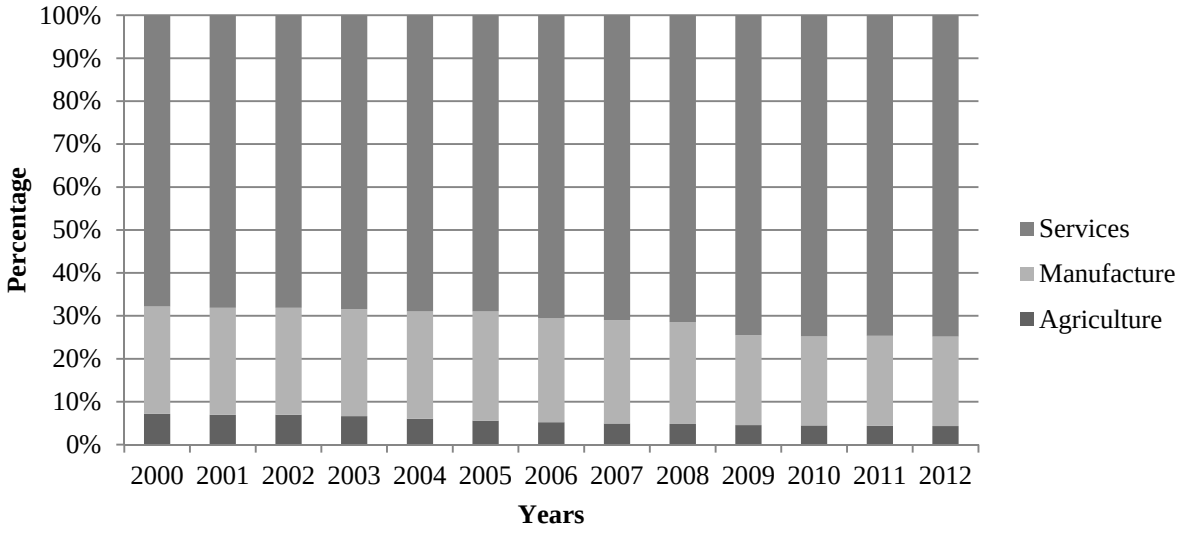


Source: Statistical Office of the Slovak Republic (2013)

Our empirical findings show that Okun's Law does not hold for the Slovak labour market because the unemployment rate for the period 2008-2012 have increased by 4.4% and Real GDP have decreased only by 2.8% for the same period.

In Slovakia the number of employees in the agricultural sector has declined steadily and reached 4.35% in 2012, comparing to year 2000 when it was 7.16%. On the other hand, the number of employees in services grew from 67.82% in 2000 to 74.82% in 2012, while the number of employees in manufacturing has decreased from 25.02% in 2000 to 20.83% in 2012. Labour productivity (value added per worker) in agriculture in Slovakia grew over the period analyzed. (See Figure 5)

Figure 5 Employees level in Slovakia according to economic activities from 2000 to 2012 (in %)

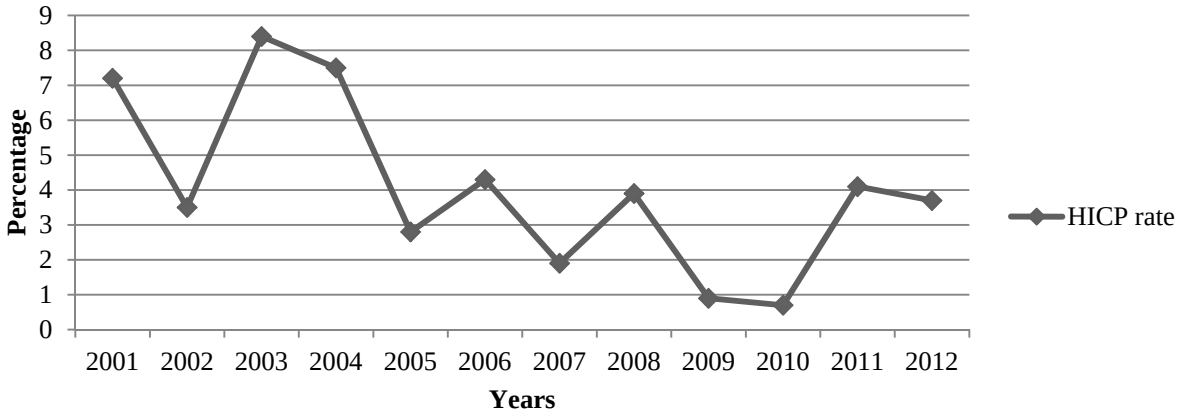


Source: Statistical Office of the Slovak Republic (2013)

3.5 Inflation in Slovakia

Slovakia faced an average rate or HICP, which varied from 8.4% in 2003, compared to the prices in the same period last year, actually was the highest inflation rate recorded for the entire analyzed period from 2001 to 2012, and the lowest inflation rate of 0.9% was registered in 2009. Figure 6 shows that in 2012 inflation have been 3.7%.

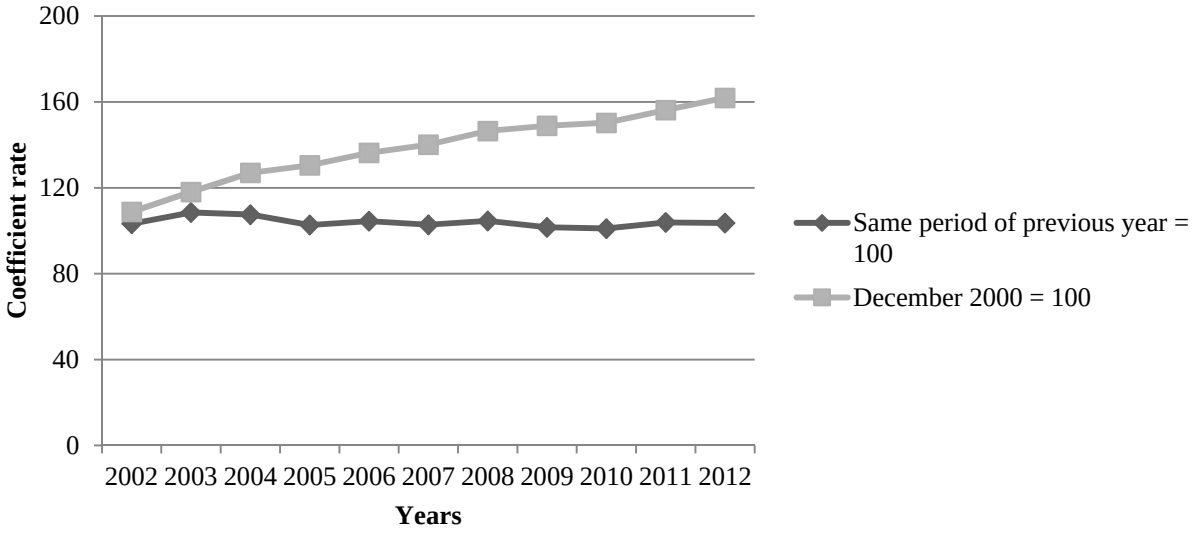
Figure 6 Average annual rate or HICP in Slovakia for the period 2001-2012 (in %)



Source: Eurostat (2013)

The index of consumer prices was the highest in 2003, almost 108.5, which means 8.5% inflation, compared to the same period of one year ago, and the lowest was in 2010, 101.0, which means 1% inflation compared to the same period last year.

Figure 7 Consumer Price Index for the period 2002-2012



Source: Statistical Office of the Slovak Republic (2013)

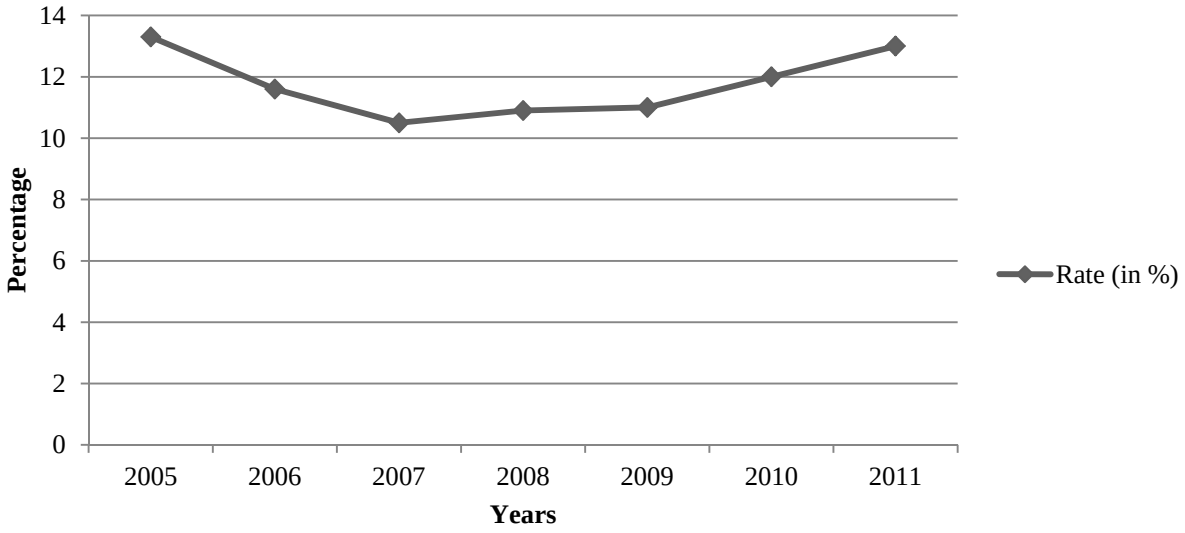
Apart from the difference in prices in the current year, comparing to the same period last year, in the paper we analyzed the difference in prices of the current year compared to the December 2000, with the coefficient 100. Thus, we concluded that consumer prices since 2002 to 2012, grew continuously and reached coefficient 161.9 in 2012, in fact the cost of living for the Slovaks as a result of convergence with EU became more expensive by 62 per cent. In 2012, prices grew mostly in education with 272.2 and health services with 203.4, followed by housing, water, energy and fuel with 244.7 and alcoholic beverages and tobacco with 187.0, compared to December 2000. On the other side, prices for furniture and furnishings in 2012 fell by 12.2%, with coefficient 88.8, compared to December 2000.

3.6 Level of income in Slovakia

The European Union Statistics on Income and Living Conditions (EU-SILC) in Slovakia started to be implemented in 2005, together with other European countries that joined the European Union in 2004.

According to OECD (2011) Slovakia together with the Czech Republic belongs to the countries with the least exposed persons at risk of poverty from the member countries of the OECD, also from member countries of the European Union. Slovak citizens with average incomes below 60% from the country's average in 2011 were only 13%.

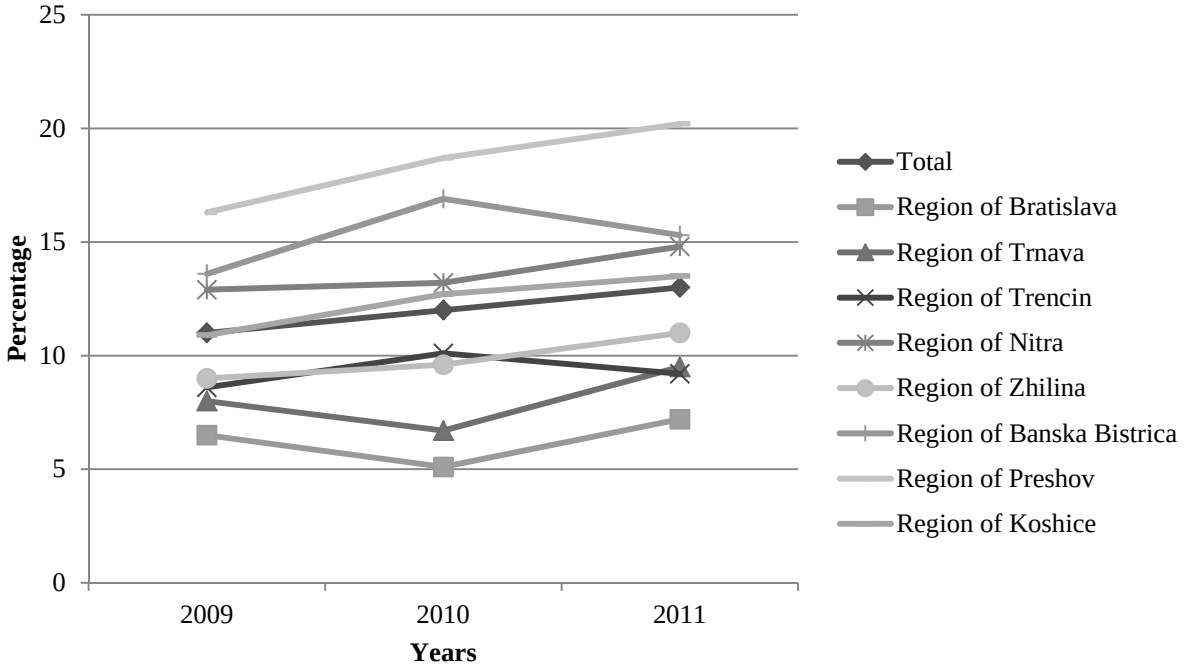
Figure 8 At risk of poverty after social transfers in Slovakia from 2005 to 2011, in % (covering all ages, both genders)



Source: Statistical Office of the Slovak Republic (2013)

Prešov region has the most people at risk of poverty that reached 20.2% in 2011, and the region with least people at risk of poverty 7.2% were in Bratislava in 2011.

Figure 9 At risk of poverty after social transfers and according to regions in Slovakia from 2009 to 2011 in % (covering all ages, both genders)

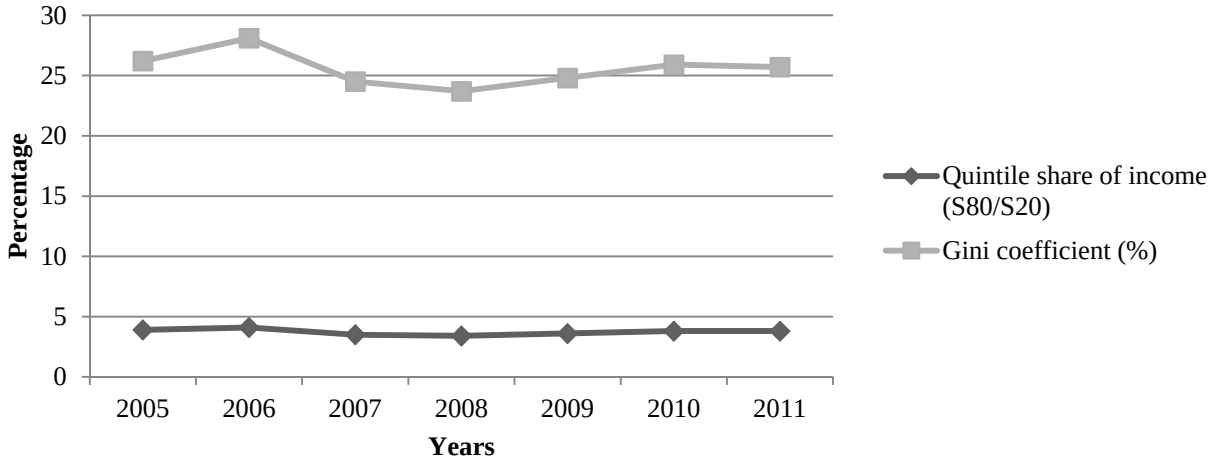


Source: Statistical Office of the Slovak Republic (2012)

The quintile's share of income for the period from 2005 to 2011 varied from 3.4% in 2008 to 4.1% in 2006. In 2011 it was 3.8, which means that the income of 20% of the population is 3.8 times higher comparing to the population with the lowest income.

Slovakia, like the Czech Republic and Slovenia had relatively low concentration of income. The gap between the incomes of rich and poor has decreased in 2011 by 0.2% and was 25.7%, comparing to 25.9% in 2010. Household income was slightly better distributed in 2008, 23.7%, and the worst were distributed in 2006, 28.1%.

Figure 10 Inequality of income distribution in Slovakia from 2005 to 2011, in (%)



Source: EUROSTAT (2013)

4 Conclusions

One of the main goals for economic integration of the member states of the EU is common progress through the expansion of the European common market, by increasing competition in goods, services and factors of production, as well as long-term economic growth. The economic effects of integration of Slovakia in EU led to drastic growth of exports of goods and services from 2000 to 2012 by 311%, with small decrease in 2009. The FDI in 2012 grew by 200 % comparing to 2000 when Slovakia wasn't EU member yet. Real GDP in 2012 comparing to 2000 has grown to four and a half times, 92 billion US$. GDP per capita grew also by four and half times, from US$ 3,775 in 2000 to 16,738 US$ in 2012. The unemployment rate in Slovakia was twice higher than in the Czech Republic and also much higher than in Slovenia for the period from 2000 to 2012. The integration in EU, brought to dcrease in unemployment rate, until 2009, reaching lowest rate 9.6%, and after that the country was affected by the global financial and economic crisis, therefore the number of unemployment was increasing every year and in 2012 was the highest in last eight years.

The effect in economic sectors was that the number of employees in the agricultural sector has declined steadily and on the other side the number of employees in services was growing. The highest rate of HICP after EU membership reached in 2011, by around 4%.

Slovakia belongs to the group of countries with the least exposed persons at risk of poverty from the member countries of the Organization for Economic Cooperation and Development. Slovakia from implementation of EU-SILC in 2005, it never reached 14% of its citizens at risk of poverty after social transfers with average incomes below 60% from the country's average. The government needs to do more to decrease the number of the risk of poverty of the people living in the more affected regions, such as Prešov region. Slovakia, similar to the Czech Republic and Slovenia had relatively low concentration of income.

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How do Czech Rural Regions Cope with the Recent Economic Crisis? Evidence Derived from Unemployment Development

Andrea Čapkovičová[1]

Abstract*: The outbreak of the recent economic crisis and the following economic recovery stimulate questions of existing resistance and endogenous capacity on national as well as regional level to cope with such an external shock. In our example, we specifically focus on rural LAU 1 regions as those that are traditionally considered to be more vulnerable to such events. For the purpose of provided analyses, we operate with variables describing the development of unemployment within the period 2008-2013. The results do not support the existence of significantly more vulnerable rural areas as a category of regions whereas they refer to heterogeneous endogenous capacity on the level of individual rural regions that affects their resistance to the crisis.*

Key words: Rural Regions · Unemployment · Economic Crisis · Czech Republic

JEL Classification: R11 · J69

1 Introduction

In the literature and policy planning, the traditionally used synonyms for rural are those as agricultural, declining, lagging and dependent. However, looking at the evolution of rural development strategies from exogenous through endogenous into neo-endogenous (Ecorys-Research and Consulting, 2010; Terluin, 2003), we need to critically acknowledge the changing importance and the role of rural areas, especially in relation to population turnaround (Marini & Mooney, 2006; OECD, 2006), the accompanied shift from production- into consumption-based use of the countryside (Marsden et al., 1993; Post & Terluin, 1997; Woods, 2005) and the process of rural commodification (for the reference see Woods, 2005).

The inevitability and the direction of changes in rural areas originate from ongoing processes of globalization, infrastructural and technological developments as well as the change in lifestyles (for the reference see Bell, 2006; Ilbery, 1998; OECD, 2006; Sotte, 2005; Woods, 2005). As an example, the stronger economic resilience of rural areas may be then related to greater variety of employment possibilities connected with newly developed consumer base and product markets. However, any external shock of such nature and magnitude as last economic crisis is the right mechanism to test the resistance of the system, in our example the rural labour markets by looking at the development of unemployment. Several studies attempted to uncover the impacts of the economic crisis on labour markets. For example, Bartsch & Scirankova (2012) focused on differences in EU regional labour market. Additionally, Czeglédi et al. (2012) analysed the effects of the crisis by comparing Hungary and Slovakia. Moreover, more national-based study was delivered by Rakowska (2014) that focused on specifics of rural labour markets in Poland by covering time period 2008-2012 that well fits into the crisis timing.

Consumers of rural (food, environment, products, culture, lifestyle, etc.) are of a great part located outside rural areas. Lowering their purchasing power in connection with the overall weaker performance of national economy, they both impose burden on the population flatly. At the same time, it opens the issue of the endogenous capacity of rural areas to fight the present situation, and so test how resilient to unexpected external shocks they are. Therefore, the objective of our study is to assess the impact of the recent crisis on the unemployment development in Czech rural areas while referring to the change of selected variables on the country level.

2 Methods

For the purpose of our analyses, we conceptualize rural areas as regions in accordance with the demographic approach to their definition (Murray, 2008). Therefore, we apply the OECD methodology (2010) that allows us to distinguish rural regions (in the methodology classified as predominantly rural) based on the variable of population density of individual settlements (less than 150 inhabitants per km2 classified as rural) and the respective share of people living in these rural settlements on the total population of the region (more than 50% classified the region as predominantly rural – rural in our case). While referring to the term region, we work with the level of LAU 1 regions (okresy in the

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Czech Republic). The final number of regions classified as rural is 21 out of 76 (excl. Prague). Data are obtained from the Public Database of the Czech Statistical Office (CZSO).

Due to generally set objective of assessing the impact of recent crisis on the unemployment development in the Czech rural areas, we focus on these variables in the time period 2008-2013:

- *unemployment rate* as the share of unemployed (unemployed-available) on the population aged 15-64 in the Czech Republic and the group of rural regions (in %)
- *change in unemployment rate* in percentual points (pp) as the annual difference between the unemployment rates
- *change in the number of unemployed* as the percentual change of unemployed from one year to another
- *dispersion of unemployment rates* (coefficient of variation) reported on an annual basis in the Czech Republic and in the group of rural regions
- *minimum, maximum, median value* of unemployment rates reported on an annual basis in the Czech Republic and in the group of rural regions describing the variance within the samples

3 Research results

The presented results comprise relevant information related in the first place to the general impact of recent crisis as being represented by the development of unemployment rates, number of unemployed of the country as a whole and the rural regions particularly. Secondly, the dispersion of the unemployment rates helps us to understand the vulnerability of the country economy (with respect to unemployment development) and specifically of the rural economies. Moreover, focusing on rural regions allows us to assess their endogenous capacity to deal with such an external shock by comparing the observed variables with national numbers.

3.1 Development of unemployment rates in the ongoing crisis over 2008-2013

Prior to the beginning of the crisis, the unemployment rate on the national level was relatively low (4.5%) (Table 1). The situation in rural regions was also relatively optimistic with the difference of only 0.7 pp. At this point, it is good to notice that generally talking about rural regions as of lagging, less dynamic, declining and backward does not rightly illustrate the real situation, at least not at the time when the Czech Republic experienced years of (successful) transformation from centrally-planned to market economy and integration into the EU. By moving in time forward, we can see that the final result of the crisis dating the measured unemployment rates to 2013 stopped at 8.2% unemployment rate at the national level, and 8.6% at the level of rural regions.

Table 1 Unemployment rate, in %

	2008	2009	2010	2011	2012	2013
Czech Republic	**4.5**	7.1	7.4	6.8	7.4	**8.2**
Rural regions	**5.2**	8.0	8.4	7.5	8.0	**8.6**

Source: own processing based on the Public Database (CZSO)

3.2 Changes in unemployment rates in the ongoing crisis over 2008-2013

The pp differences in unemployment rates year by year within the observed time period (2008-2013) are displayed on Table 2. Is it obvious that the most significant change in relation to pp increase of unemployment rates was from 2008 to 2009. In a cumulative effect of pp changes in unemployment rates from 2008-2013, the pp change achieved on the national level was +3.7 and +3.5 on the level of rural regions. Therefore, any significantly negative effect of crisis that would support the economic vulnerability and instability of rural regions relative to the national development was not revealed. It is noteworthy to say that this may be attributed to the structure of rural employment (shares of sectors, especially the traditional ones as agricultural or public administration services) as well as the character of networks with extralocal economic partners (share of inter-municipal, regional, national or global networks) or reported slightly higher unemployment rate compared to the national one (see Table 1).

Table 2 Unemployment rate increase in pp

	2009-2008	2010-2009	2011-2010	2012-2011	2013-2012	2013-2008
Czech Republic	2.6	0.3	-0.6	0.6	0.8	**3.7**
Rural regions	2.9	0.4	-0.9	0.5	0.6	**3.5**

Source: own processing based on the Public Database (CZSO)

3.3 Changes in the number of the unemployed over 2008-2013

While till now we were referring to relative changes in unemployment development (unemployment rates), at this point we look at the absolute numbers of the unemployed and how these changed under the recent crisis (Table 3). Corresponding to the Table 2, the number of the unemployed increased the most from 2008 to 2009 (57.5% in the Czech Republic and 55.00% in rural regions). We may see from these numbers that the shock from the crisis was really big for

the economy (both national and rural) as well as for individuals suffering from the economic downturn. Another important number from the Table 4 is in the last column that represents the percentual change in the number of the unemployed between 2008-2013. In accordance to previously mentioned reasons (stability of sectors in rural regions, origin of economic networks on the local level to extralocal environment) and some others (scope and targeted markets of the rural production, etc.), rural regions experienced the slower pace of change in the number of the unemployed than the Czech Republic as a whole when we relativize the number of the unemployed in 2013 to 2008 (it is important to mention that the increase in the number of the unemployed on the national level is only by 15.4% attributable to the increase in number of the unemployed in rural regions).

Table 3 Change in number of unemployed (%)

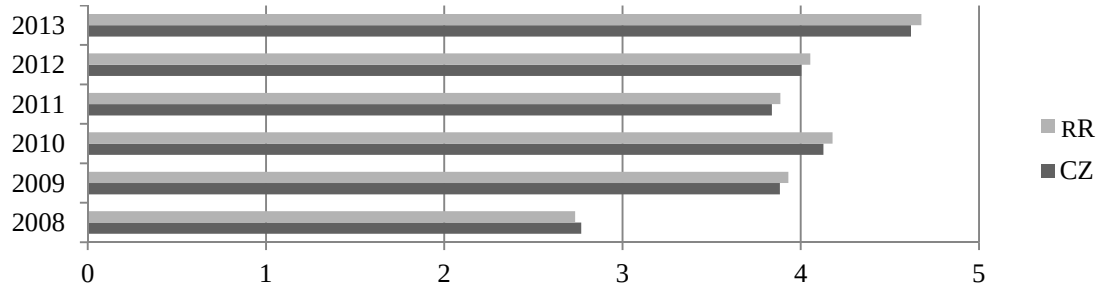
	2009/2008	2010/2009	2011/2010	2012/2011	2013/2012	2013/2008
Czech Republic	57.5	3.6	-10.0	7.9	9.8	**+74.0**
Rural regions	55.0	4.6	-12.0	5.3	6.0	**+59.1**

Source: own processing based on the Public Database (CZSO)

3.4 Dispersion of unemployment rates over 2008-2013

We may notice from Figure 1 that as the crisis evolves and the economy tries to recover from its impacts, the dispersion of unemployment rates increases. This only illustrates the regional character of impacts that respects the particularity of each and every location and its ability to react and deal with such an external shock. As it was expected, prior to the crisis (2008) the overall condition of the economy was relatively good (low unemployment rate, low dispersion between the regions). However, from 2009 onwards the crisis enhances the regional differentiation, both on the national level as well as on the level of rural regions particularly. In fact, the rural is not homogenous group as also not any other categories of regions (e.g. urban) what only supports the existence of such dispersion.

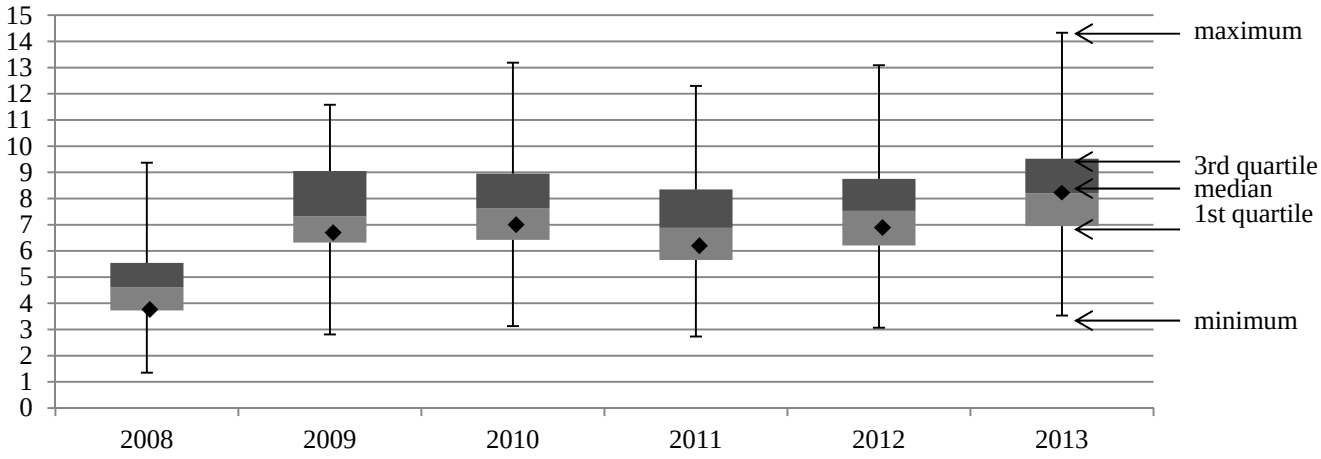
Figure 1 Annual dispersion of unemployment rates (coefficient of variation) in the Czech Republic (CZ) and rural regions (RR)



Source: own processing based on the Public Database (CZSO)

As we already acknowledge the existence of great variance on the national level and the level of rural regions, Figure 2 and Figure 3 illustrate the minimum, maximum and median values achieved on these varied unemployment rates. At the level of the Czech Republic as a whole (Figure 2), we may see increasing absolute difference between minimum and maximum unemployment rate reported on the level of regions as well as the increasing median value (with slight decline in 2011). The same trend holds also for rural regions (Figure 3).

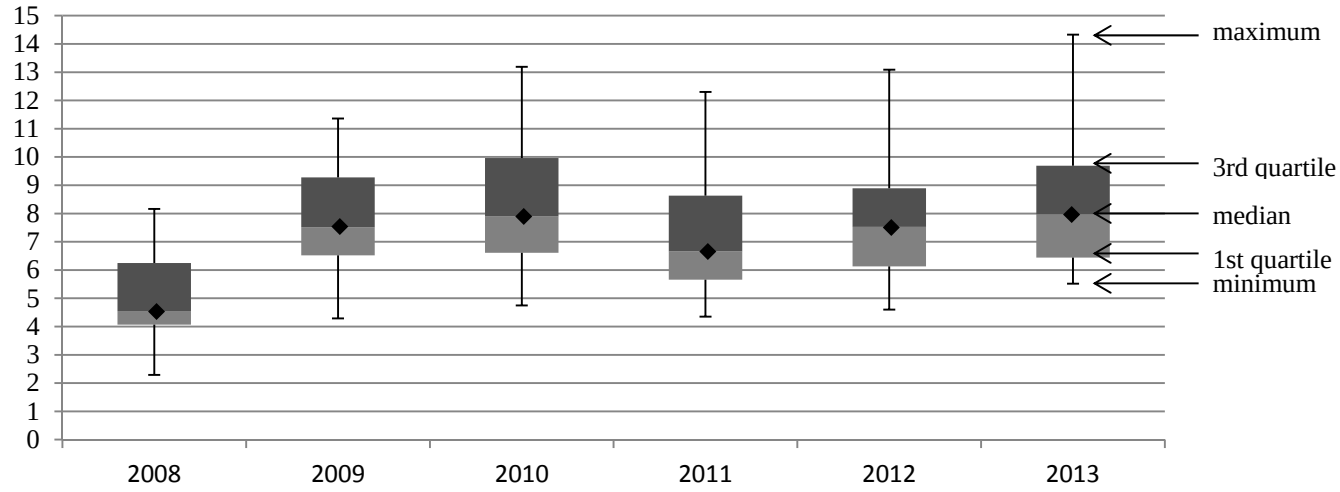
Figure 2 Variance of unemployment rates (in %) within the Czech Republic



Source: own processing based on the Public Database (CZSO)

However, rural regions show lower absolute difference between minimum and maximum in their individual regions. On the other hand, we may also notice that the minimum values on the national level are recorded below those of rural regions what indicates the existence of economically stronger regions to the rural ones (that is obvious, e.g. regions around the Prague). The maximum values from 2010 onwards are achieved by rural regions.

Figure 3 Variance of unemployment rates (in %) within rural regions

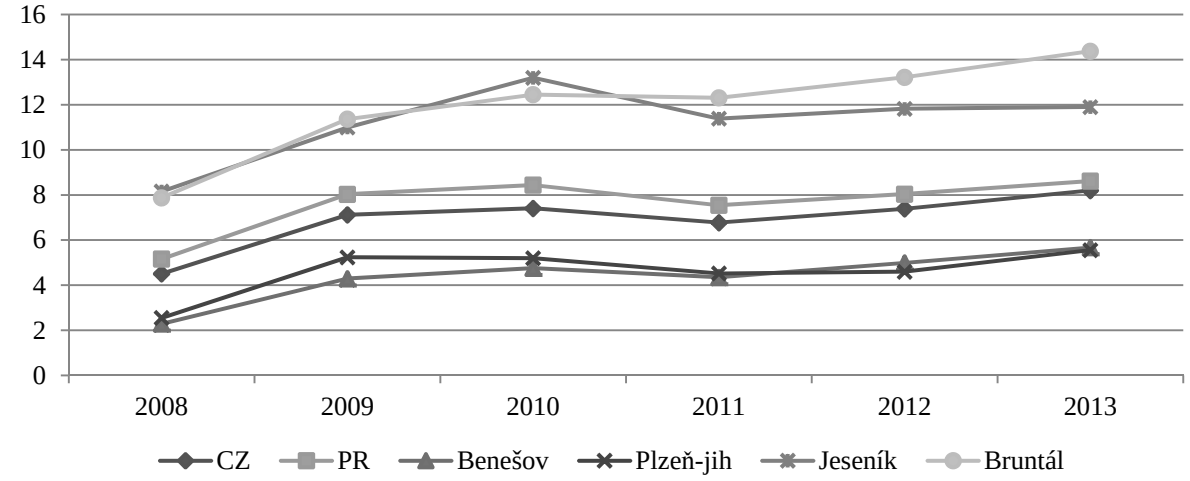


Source: own processing based on the Public Database (CZSO)

3.5 Particularity of unemployment development in the example of best and worst performing rural regions

While looking at the Figure 4, we may observe the change of unemployment rates within the period 2008-2013 in the example of two best and two worst performing rural regions (as well as the reference group of the Czech Republic and the rural regions – PR). The best performing rural regions (Benešov and Plzeň-jih) keep the unemployment rates below the national level as well as the rural one. On the other hand, the examples of worst performing regions (Jeseník and Bruntál) show higher vulnerability in relation to the economic crisis and subsequent economic regeneration. The unemployment rate of Bruntál is increasing even during the whole period. From Figure 4 it is important to acknowledge the existing heterogeneity among the rural regions what only further supports the particularity of their development as well as the need of regionally designed strategies that will fully utilize their potential and respect their needs.

Figure 4 Annual developments of unemployment rates in two best and two worst performing rural regions[1], Czech Republic and rural regions



Source: own processing based on the Public Database (CZSO)

4 Conclusions

The presented results, describing the impact of recent economic crisis on the unemployment development in the Czech Republic as a whole and its rural regions, further support the understanding of the group of rural regions as those that are not significantly more vulnerable to such an external shock. However, some conclusions can be drawn regarding the rural regions as a group as well as their individual examples.

First, the pp increase of the unemployment rate in the rural regions as a result of crisis from 2008 to 2013 was even slightly lower than the national one. This implies that the characterization of the rural regions as those of higher economic vulnerability and instability is not fully right. On the other hand, the observed development may be attributed to rural specifics, especially those related to the structure of rural employment and the character of business/trade networks in which rural businesses are involved.

Second, the overall (national) increase of the unemployment rate within the observed time period was on faster pace than in the rural regions. Moreover, the increase in the number of the unemployed on the national level is only by 15.4% attributable to the increase in the number of the unemployed in rural regions. It demonstrates the existence of rural labour market specifics that have the potential to mitigate impacts of such an external shock (e.g. the role of public sector in providing the employment), but also questions the issues related to the attractiveness of these location for the creation of business networks (regional, national, international) that may enhance the regional vulnerability at the time of crisis considering the business dependence on external factors (and resulting decisions about layoffs).

Third, the dispersion of the unemployment rates described by the coefficient of variation as well as the development of minimum, maximum and median values on the national level and the level of the rural regions further points out to the existing heterogeneity on the level of individual regions of any kind (rural, urban, intermediate). Therefore, as in the group of Czech regions as a whole and particularly in the group of the rural regions, we may find examples of well-performing as well as worse performing regions when we need to inevitably refer to existing regional differences (see the example of Jeseník and Bruntál on one hand, and Benešov and Plzeň-jih on the other). This gives some support to the need of regionally designed strategies that will fully utilize regional potential and respect regional needs, especially related to the mitigation of impacts of the recent economic crisis.

Results from the present study point towards the higher attention both of researchers and policy makers on the issues related to special rural labour market characteristics. In this sense, we may focus on the structure of employment (public and private employment providers) as well as the character of existing networks that create the preconditions for successful economic recovery in certain regional conditions.

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Transport as a Key Factor of Competitiveness in Selected Regions

Filip Petrách, Jiří Alina[1]

Abstract*: Due to worldwide economic crisis the flow of passengers and goods have dropped down significantly all around the world. Moreover it has caused and placed severe constraints for number of manufactures, transport operators and facilities. Besides this, we can observe consequences for the many workers in the transport sector. The transport sector has been suffering heavily as a result of the global economic crisis. Connection with other sectors, GDP at level of country and regions is obvious. With ailing global financial markets, several panelists noted that credit is lacking for maintenance and for the development of new infrastructure and equipment in all modes of transport. This paper focuses on the period in which they are captured all phases of economic growth in the time interval between years 2005 – 2012. The aim of this thesis is to analyze the dependencies between trends in economic development in the Czech Republic (with a focus on South Bohemia and South Moravia Region) and trends in the overall performance of the transport companies and the volume of goods transported within the region.*

Key words: Rural Road Transport · Economic Crisis · Region

JEL Classification: O18

1 Introduction

Czech economy is in a period of gradual economic growth recover. This growth is not stable, as well as on a global economy. This paper focuses on the period in which they are captured all phases of economic growth in the time interval between years 2005 - 2012, when the Czech economy maintained steady growth until 2007 and since 2007, respectively since 2008 it has been seeing a significant downturn in the global recession, which was started by the mortgage crisis in the USA and subsequently endorsed by the debt crisis in Europe. This situation was stabilized gradually released by cash flows from the governments of individual member countries to problematic areas. The effect of these steps, did not bring enough satisfactory stable condition. Transport by itself is very sensitive to the economic development and this paper attempts to capture the trends of selected economic indicators of two regions in comparison with performance indicators in road cargo transport.

Transport has not been in the focus of rationalization, because the relatively low transport prices induced miniaturization of spare parts and global distribution of the workflow, making use of wage cost differentials and improved proximity to the markets. Global supply chains with scheduled delivery patterns were developed to minimize inventory holding, at the cost of additional transport activity. The economic crisis has led to a dramatic reduction of international trade and freight transport (Rothengatter, Hayashi & Schade, 2011). Many underscore the opportunities presented by the economic crisis. It can change the course of economic growth to a more sustainable and innovative, technologically progressive and dynamic tomorrow (Perrels, 2010). Productivity is one of the main factors which influences and determinates economic growth in economy. Productivity in each branches (sectors) reacts differently in periods of the economic downturn (Volek & Novotná, 2012). In the economic crisis of 2009 a lowered demand for transport services met an increase in transport capacity. The result was a price collapse, which intensified competition in transport markets. This situation has highlighted the price sensitivity of combined transport services. In summer 2009, road carriers offered their services at a price level not covering their marginal costs to sustain liquidity. Owing to the lower fixed costs and an often thin capital base, road carriers operated with massive allowances in the market (Bedul, 2014).

Transport infrastructure is linked with economic development, the need for job creation and the development of other sectors related to the material, the transfer of materials, etc industries. On the other hand, the development of transport infrastructure associated with considerable financial means. Crisis period led to a significant reduction in funding for the development of transport infrastructure, which greatly limits its further development and strategic transport routes stop. Insufficient funds should be generated in the form of tax plus fees and tolls for the use of transport routes. The government decided to increase revenue items for the financing of infrastructure in 2010 and excise tax for items fuels and lubricants, vignettes and Toll roads and expressways (toll). Expected income is increased, however, in the excise duty on fuels and lubricants; there is no sufficiently underflow State Transport Infrastructure Fund. Con-

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versely excise tax revenue is falling, there is a shopping tourism fuels. Price rises can often be for small and medium business liquidation, financial problems shipping companies. All these facts can clearly be indicators decline of the region. (Botlíková, Botlík & Václavíková, 2013)

The results indicate that investments in road infrastructure imply faster returns in growth in GDP than railroad investments. (Silva, Martins & Rocha, 2013) Macroeconomic cross-country evidence shows that investment in the transport sector promotes growth by increasing returns to private investment. The estimated economic rate of return of projects in the transport sector is 22 percent, which is 50 percent higher than World Bank average. (Batta, 2008)

2 Methods

There is analyzed category 49410 Road cargo transport in the CZ-NACE classification in the context of economic development in this article. The aim of this thesis is to analyze the dependencies between trends in economic development in the Czech Republic (with a focus on South Bohemia and South Moravia Region) and trends in the overall performance of the transport companies and the volume of goods transported within the region. For this analysis we used data from the Czech Statistical Office and the database Albertina. Development is observed in time period between years 2005 - 2012 with a focus on annual changes. To capture the trends in the indicators development were used the following relations:

$$Growth\ rate = \frac{x_t - x_{t-1}}{x_{t-1}} \tag{1}$$

$$Growth\ coefficient\ (k_t) = \frac{y_t}{y_{t-1}}, t = 2, \dots, T. \tag{2}$$

$$Average\ Growth\ Coefficient\ (\bar{k}) = \sqrt[T-1]{k_2 * k_3 * \dots * k_T} = \sqrt[T-1]{\frac{y_2}{y_1} * \frac{y_3}{y_2} * \dots * \frac{y_T}{y_{T-1}}} = \sqrt[T-1]{\frac{y_T}{y_1}} \tag{3}$$

Interdependencies between observed variables were then tested by using Spearmen correlation coefficient at a significance level α = 0.05. According to the author Marek (2007) If the random variables *X* and *Y* are quantitative random variables with a common two-dimensional normal distribution, than we use for specific values (x_1, y_1), (x_2, y_2), ... (x_n , y_n) this selective correlation coefficient:

$$r = \frac{\sum_{i=1}^{n}(x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \overline{x})^2 \sum_{i=1}^{n}(y_i - \overline{y})^2}} \tag{4}$$

The overall revenues of the transport companies were monitored on a sample of enterprises in the total number of 946 (Czech Republic), 68 (South-Moravian Region) and 71 (South Region), while there was always used median of revenues reported in the profit and loss list of individual businesses.

3 Research results

The following part presents data needed for calculations. Figures 1 – 3 and Tables 1 – 3 shows the trends of annual changes of the selected regions in comparison with Czech Republic. As can be seen, all trends are very similar.

Table 1 Annual percentage change of revenue

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
SB	-12.2	-23.10	-12.12	-17.92	9.78	-9.30	5.87
SM	27.33	26.94	17.12	-23.74	1.41	-16.92	3.20
Czech Republic	6.12	5.34	2.97	-12.90	9.24	12.77	-5.53

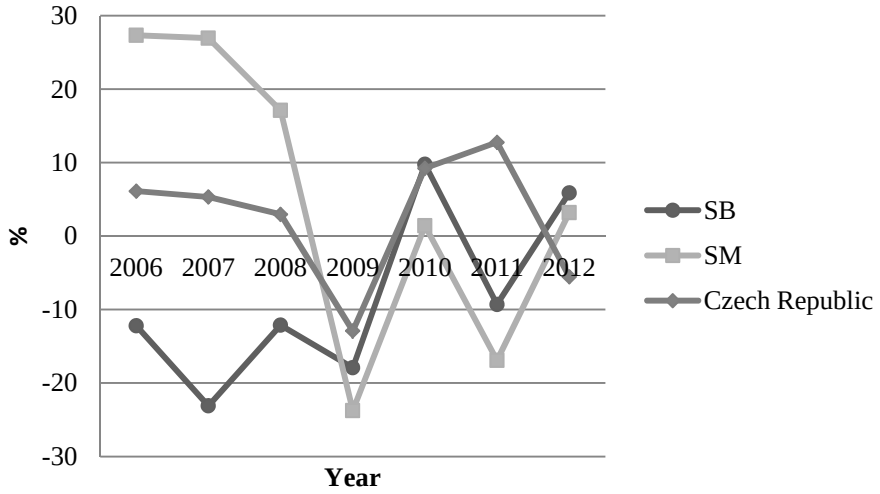
Source: Database Albertina, Own processing

Table 2 Annual percentage change of GDP

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
SB	4.89	4.58	1.00	0.00	-0.31	-0.13	1.62
SM	8.99	9.88	7.60	-1.90	0.67	1.22	1.63
Czech Republic	6.9	5.5	2.7	-4.8	2.3	2.0	-0.8

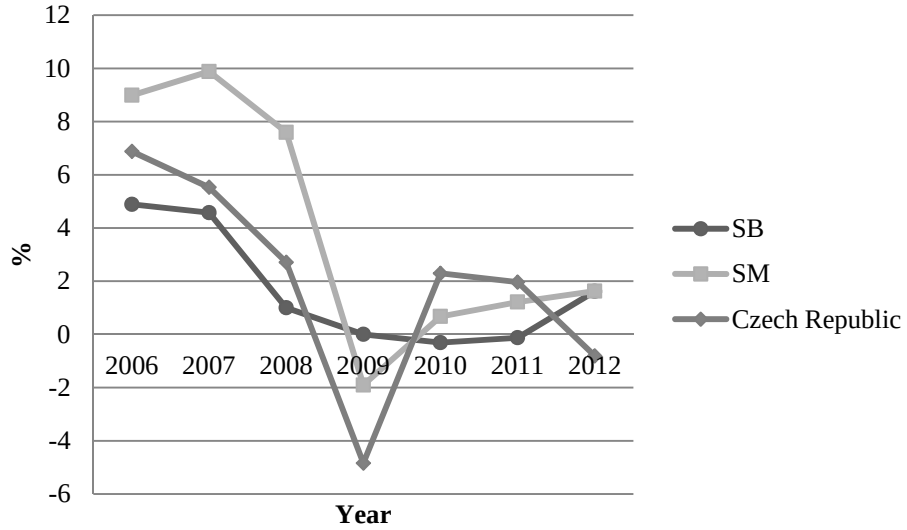
Source: Czech statistical office, Own processing

Figure 1 Annual percentage change of revenue



Source: Database Albertina, Own processing

Figure 2 Annual percentage change of GDP



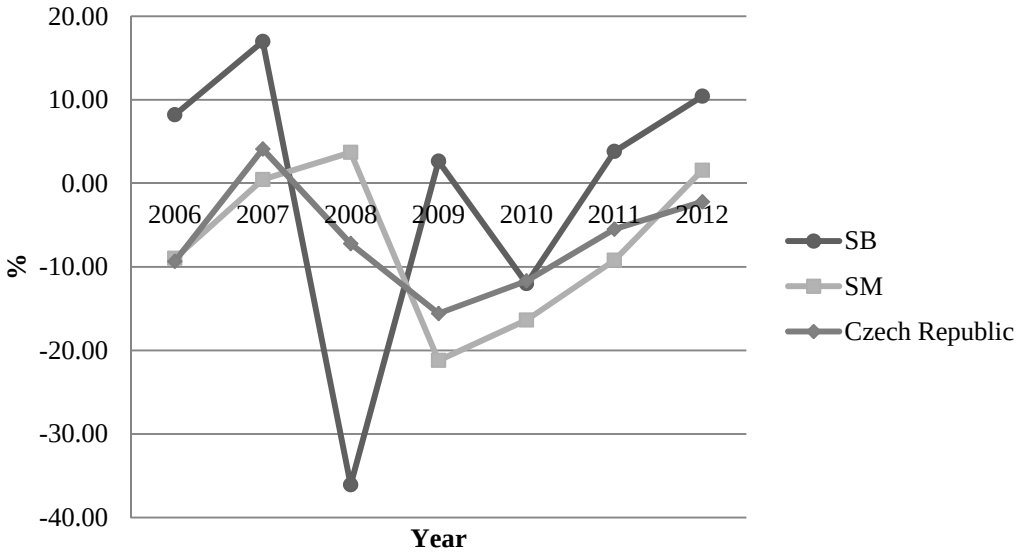
Source: Czech statistical office, Own processing

Table 3 Annual percentage change of transport of goods within the region (thous. t)

	2006	2007	2008	2009	2010	2011	2012
SB	8.20	16.98	-36.09	2.65	-11.99	3.83	10.43
SM	-8.97	0.46	3.71	-21.20	-16.36	-9.20	1.57
Czech Republic	-9.34	4.11	-7.22	-15.58	-11.68	-5.48	-2.21

Source: Czech statistical office, Own processing

Figure 3 Annual percentage change of transport of goods within the region (thous. t)



Source: Czech statistical office, Own processing

Table 3 Dependace of variables (correlation matrix) – Czech Republic

	Annual percentage change of revenue	Annual percentage change of GDP	Annual percentage change of transport of goods within the region
Annual percentage change of revenue	1.0000 (p= ---)	**0.7565 (p=0.049)**	0.2927 (p=0.524)
Annual percentage change of GDP	**0.7565 (p=0.049)**	1.0000 (p= ---)	0.4736 (p=0.283)
Annual percentage change of transport of goods within the region	0.2927 (p=0.524)	0.4736 (p=0.283)	1.0000 (p= ---)

Source: Czech statistical office, Database Albertina, Own processing

Dependence of variables at nationwide level was statistically significant only between annual percentage change of GDP and Annual percentage change of revenue. There was a strong dependence 0.7565 at a significance level $\alpha = 0.05$. Dependences between other variables were not rendered, because they were no statistically significant. It is visible at figures 1, 2 a 3, that the trends are different between Annual percentage change of transport of goods within the region and other variables.

Table 3 Dependence of variables (correlation matrix) – SM

	Annual percentage change of revenue	Annual percentage change of GDP	Annual percentage change of transport of goods within the region
Annual percentage change of revenue	1.0000 (p= ---)	**0.9348 (p=0.002)**	0.6286 (p=0.131)
Annual percentage change of GDP	**0.9348 (p=0.002)**	1.0000 (p= ---)	0.6489 (p=0.115)
Annual percentage change of transport of goods within the region	0.6286 (p=0.131)	0.6489 (p=0.115)	1.0000 (p= ---)

Source: Czech statistical office, Database Albertina, Own processing

The situation was similar at South Moravia region as well as at nationwide level. Dependence of variables at South Moravia region was statistically significant only between annual percentage change of GDP and Annual percentage change of revenue too. But in this case there was a stronger dependence 0.9348 at a significance level $\alpha = 0.05$. Dependences between other variables were not rendered, because they were not statistically significant.

Table 3 Dependence of variables (correlation matrix) – SB

	Annual percentage change of revenue	Annual percentage change of GDP	Annual percentage change of transport of goods within the region
Annual percentage change of revenue	1.0000 (p= ---)	-0.4498 (p=0.311)	-0.1888 (p=0.685)
Annual percentage change of GDP	-0.4498 (p=0.311)	1.0000 (p= ---)	0.4715 (p=0.286)
Annual percentage change of transport of goods within the region	-0.1888 (p=0.685)	0.4715 (p=0.286)	1.0000 (p= ---)

Source: Czech statistical office, Database Albertina, Own processing

Southbohemia region was specific. There were not rendered any dependences between variables and there were negative correlation coefficients. A significance level $\alpha = 0.05$ was exceeded at all cases. Statistically significant dependence could not be prove.

4 Conclusions

The aim of paper and research activity of authors is to describe trends and dependences among transport of goods within the region, gross domestic product and revenue of selected companies in the road transport cargo branch. The trends are almost same at all three indicators and were confirmed by statistical methods. The dependence was only confirmed at GDP and revenue. Transport of goods and other indicators did not prove statistically significant dependence. Region consequences of the transport impacts quantification are closely related to economic growth and are essential in time of economic crisis. Further research, comparison of more regions is the goal of authors for future.

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Current Conditions of Labor Market in South Bohemian Region and Niederbayern

Jana Žlábková, Dagmar Škodová Parmová[1]

Abstract*: The paper is focused on unemployment development. It shows two neighboring regions of South Bohemia and Niederbayern in the context of the analysis of unemployment in the Czech Republic and Bayern. Selected regions are very similar in size, structure and climatic conditions. The unemployment rate has developed in both regions in a different way. Observation period was chosen from 2004 till 2012. There are different systemic measures to reduce the unemployment rate in both regions. Their impacts on the development of unemployment are also very different.*

Key words: Labor Market · Unemployment · Regional Employment · Bavaria

JEL Classification: O15

1 Introduction

Regional labor market in Central European countries and its definition will grow in importance in the future. The so-called geographical mobility will lose its importance, because it still leads to increased automobile traffic and new information and communication technologies have also a very significant impact on the regional labor market. There are also new forms of work organization developed that are not as strongly tied to space, for example Teleworking. The use of these technologies is still limited in the Czech Republic, although it is successfully developed in neighboring Bavaria. The unemployment rate is based on the Eurostat methodology used by the Czech Statistical Office as well as the Regional Statistical Office for Bavaria. They are drawn up on the basis of the recommendations of the International Labour Organisation.

2 Objectives and methodology of work

Objectives of this paper are focused on unemployment development in the last decade. The paper shows two neighboring regions of South Bohemia and Niederbayern in the context of the analysis of unemployment in the Czech Republic and Bayern. Data for analysis and comparison contain information about the unemployment rate in the Czech Republic and in the region of South Bohemia, along with information about the unemployment rate in the region and Bayern Niederbayern. For comparison there will be used nonparametric Mann-Whitney test.

$$H_0 : \tilde{\mu}_{50CZ} = \tilde{\mu}_{50SRN} \tag{1}$$

$$H_A : \tilde{\mu}_{50CZ} \neq \tilde{\mu}_{50SRN} \tag{2}$$

Non-parametric tests were used to compare the statistical data, the use is more general than parametric tests. At the same time, a test of proportionality will be used. It will include a test of suitability, necessity test and benchmarking test. For the purpose of assessing the similarity of characteristics of individual territorial units, ie. South Bohemian Region and Niederbayern will be used hierarchical cluster analysis. For the purpose of distance characteristics of individual clusters will be used algorithm average linkage. As a metric there will be used the classical Euclidean metric.

3 Results

Analysis of unemployment in two neighboring regions of South Bohemia and Niederbayern is carried out in the context of the analysis of unemployment in the Czech Republic and Bayern (ČSÚ, 2013; Potměšil, 2012). Regions are very similar in size, structure and their climate. The unemployment rate developed there in a different way. The beginning of the observation and analysis is the year 2004, the Czech Republic's accession to the European Union. While in 2004 the general unemployment rate in the Czech Republic was 8.3% and in the South Bohemian Region at the level of 5.7%, in the Land Bayern rates were 7.0% and 6.8% for Niederbayern region. In 2012, the general unemployment

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rate in the Czech Republic increased to 7.0% and in the South Bohemian Region reached 5.2%, in the Land Bayern rates were 3.5% and 3.3% for the Niederbayern region. These data are very interesting from the point of view if you go into a deeper perception. Although Bayern region Niederbayern also have some of the highest wages in Europe and the Czech Republic including the South Bohemian region can benefit from the fact that labor costs are much lower here, so it has in this respect a competitive advantage, Czechs do not reduce their unemployment as much as in Bayern and in Niederbayern. Bayern and Niederbayern managed to reduce their unemployment up to 50% in the period of 2004-2012 and in Niederbayern it's about more than 50%. In the Czech Republic the reduction reached only 1.3%, and the South Bohemian Region only 0.3% (ČSÚ, 2013; Bayerishes Landesamt fuer Statistic, 2013). And this despite the fact that the Czech Republic carried out a number of reforms with its main aim to reduce unemployment.

What was the idea behind it is a matter for discussion. It may be that in the Czech Republic no economic growth is to seen and the economy does not recover. Germany and Bavaria, of course, is for the Czech Republic its largest trading partner. Unemployment in Germany is declining but labor costs are in Bavaria and Lower Bavaria very high. We may consider, that the situation on the German labor market should be reflected in a certain time on the Czech economy (Stimson, Stough & Roberts, 2006).

Questionable is also the veracity of the argument that raising the minimum wage leads to a rise in unemployment. Even an increase in the minimum wage in the Czech Republic took several years, since the political discussion was based on unsubstantiated claim that raising the minimum wage is correlated with a rise in unemployment. In Bavaria, they did not accept this argument. Salaries are at the highest level in Europe and unemployment is steadily falling. The minimum wage dos not exist in Bavaria (Federal Ministry of Food and Agriculture, 2006).

In the Czech Republic this is enhanced even by further facts. Due to the actions that took place under the new Employment Act, probably causing a situation where even if the citizen became unemployed did not entered the registration of unemployed. It was highly criticized by the public the so called system DONEZ (Attendance unemployed). In this system, selected jobseekers had to attend twice a week to the post office, or the Czech Point of contact for Czech Post, in a randomly determined time within normal working hours. The official aim of the introduction of the system was to reduce the so-called. Illegal work and increase employment. The question remains whether that objective can be through that system DONEZ can ever achieve. So if anyone is working illegally, probably it will not be a problem to him to be sent by the employer for the purpose to go to the post office. This system was in professional circles subtitle system of rotating citizen. The result of this measure is only an enhanced statistic and reduced unemployment in the country and in the region. To add - a similar system exists in the UK or in the USA. There is, however, this system does not affect the normal unemployed, but people previously convicted of a crime, with particular attention to sexual offenders to be supervised and to obtain a summary of their movement (Potměšil, 2012). Finally, this system in the Czech Republic failed. Mentioned objectives, such as reducing unemployment in the region and the state, can be achieved by other less restrictive means. Bavaria during the Nineties has been faced with the problem of high unemployment. The Government of the Federal Republic of Germany at the time decided for a radical solution to reform the whole system of social security. Reform meant the greatest social revolution, which the German society had not experienced since the time of Nazi Germany. Now Hartz IV was introduced and it was one of the toughest measures - it brought a big change in unemployment benefits. At the same time under this reform a long-term unemployed has to accept any legal job that was offered to him. Reject it only allowed if the offered salary is more than thirty percent less than the local average. Refusal of work is sanctioned, citizens who are not coming on overall unemployment, but he reduced support, ALG - Arbeitslosengeld about thirty percent in three months. If you repeatedly refuse, the benefit is reduced by thirty percent, reaching then zero. The other social benefits are reduced then, too. If he or she refuses to work for twenty-five years, then his benefits suspended completely. Gets only special orders, for which you can buy food. In accordance to the influence of Hartz reforms, and especially the law Hartz IV there was a significant decline in unemployment in Bavaria and Lower Bavaria, and the whole Germany. The tendency towards a permanent downward trend in unemployment in Bavaria and Lower Bavaria continues. It is interesting that unemployment in Bavaria is almost identical with unemployment in Lower Bavaria. The Czech environment can not show such development. Region South Bohemia has always developed significantly different from the unemployment rate in the Czech Republic. At the same time, the question is why South Bohemia has significantly higher unemployment, while in 2004, the unemployment rate in the South Bohemia of 5.7%, which is lower than in Niederbayern (Bazerishes Landesamt fuer Statistik, 2013).

Mann-Whitney nonparametric test of median value conformity for the unemployment rate, based on the Eurostat methodology, showed the following values:

$$H_0 : \tilde{\mu}_{50CZ} = \tilde{\mu}_{50SRN}$$
$$H_A : \tilde{\mu}_{50CZ} \neq \tilde{\mu}_{50SRN}$$

W = 6.5, p-value = 0.001535

When comparing unemployment rates, it was found that on the level of significance α = 0.05, the unemployment rate is in the region Niederbayern is statistically significantly lower than the unemployment rate in the region of South Bohemia.

Cluster analysis has brought the division of districts in each region and their unemployment rate to 4 clusters. The first cluster consists of the districts of Kelheim, Deggendorg, Rottal-Inn, Tabor, Jindřichův Hradec, Straubing-Bogen and Dingolfing-Landau – the unemployment rate is varying here and differs from year to year in the observed time period. The second cluster consists of Prachatice, Freyung-Grafenau, Regen, Český Krumlov, Sand, Strakonice and free towns of Landshut, Passau, Straubing – the unemployment rate differs here only very little in the observed time period. The third cluster consists of Landshut district as significantly different from the two previous districts, the development here goes against the average trend in the unemployment rate. The fourth cluster consists of districts that are very similar in their characteristics, are the districts of Passau and the district of České Budejovice – it is a cluster of regions next to big agglomerations.

4 Conclusions

Analysis of the labor market in both regions of South Bohemia and Niederbayern showed that there are important differences. Bayern pays more attention to unemployment solution measures and its development involves a larger number of stakeholders including the private sector. There is used more effectively the European Employment Strategy, which aims to participate actively in solving the problems of the labor market and use resources actively from EU funds related to the issue of employment at the same time. German labor offices have long experience with regional labor markets and seek to eliminate regional differences in labor demand and supply. At the same time they have also more sophisticated social cohesion, reducing regional disparities in unemployment and thereby achieving lower unemployment rate at all.

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Participation of Citizens in Public Life in Nové Hrady

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Abstract*: This case study is focused on the issue of participatory activities of citizens in the local political environment in the municipality of Nové Hrady. The aim of the study is to clarify the functioning of public administration in the selected town in terms of the participation of local citizens in public life activities. In particular, this means political participation at the local level, as well as the involvement of citizens in community life in the town. This paper deals with the activities of citizens during elections, their involvement in municipal bodies and participation in public affairs through political parties and independent associations. The paper further focuses on non-political forms of participation through civic associations and interest groups.*

Key words: Municipality · Citizen· Participation · Public Life · Voter Participation · Municipal Elections

JEL Classification: D72 · H83 · J18

1 Introduction

Modern systems of representative democracy are facing declining voter participation and low interest of citizens in taking responsibility in the political process. Disturbing events in the development of modern democracy are influenced by many factors; in particular, these are variations in political parties whose role in indirect democracy is to ensure the mediation of interests between citizens and politicians. The long-lasting problem of indirect democracy is the "difference" between national and regional or local level politics, as there is cleavage between centre and periphery. For this reason, new ways are being sought out to engage citizens in the political process and enhance their participation in public life (Čmejrek, 2009).

Citizens' participation in elections is considered one of the main conditions for a functioning democratic system, and as a significant problem of representative democracy. According to sociological and political science studies, indirect democracy systems have long been struggling with declining voter participation and a lack of interest of citizens to take responsibility in the political process (Čmejrek, Bubeníček & Čopík, 2010).

2 Methods

This paper aims to clarify the functioning of public administration in Nové Hrady (Southern Bohemian Region, České Budějovice District) in terms of citizen participation. The aim is to show to what extent and how the town's citizens participate in public life and in shaping local politics. The paper analyses the forms of political and non-political participation of citizens.

The paper is conceived as a case study. This work covers the period from the municipal elections in 1994 to municipal elections in 2010. The object of research is the town of Nové Hrady. The subjects of research are the town's inhabitants and their participatory activities in public life. The data collection techniques used to meet the objectives of the paper are unstructured interviews with citizens and political representatives of the municipality. The paper is also based on the study of literature and documents, syntheses and comparison of professional literature (Čmejrek et al., 2009; Balík, 2009) and professional articles (Outlý, 2003; Jüptner, 2004). The paper was also created on the basis of consulting local periodicals (Novohradský newsletter), and data was used from the Czech Statistical Office, in particular the election server.

3 Research results

3.1 Characteristics of the municipality

The town of Nové Hrady is located near the Austrian border, approximately 30 kilometres southeast of České Budějovice - the Southern Bohemian Region, České Budějovice District. The municipality with extended powers is Trhové Sviny.

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The first written mention of the municipality dates from 1279. At that time a medieval castle was built in the town belonging to the Vítkovci family. In 1620 Nové Hrady become the seat of the Buquoys, who resided in the town until 1945.

Historically, Nové Hrady has been predominantly ethnically German. During a census of the population in 1890, more than half of the inhabitants identified with German nationality.[2]

According to the census in 2011 (as of 26th March) 2 513 people resided in the municipality. Nové Hrady had its largest population at the end of the 19th century. The number of inhabitants decreased dramatically after WWII after the displacement of the Germans. Since that time the number of inhabitants in the municipality has slightly increased due to an influx of immigrants.

Table 1 Development of the number of inhabitants in the municipality (always as of 31 December)

Year	1869	1880	1890	1900	1910	1921	1930	1950	1961	1970	1980	1991	2001	2010	2011	2012
Inhabitants	4 566	4 900	4 999	4 997	4 642	4 375	4 086	2 221	2 452	2 373	2 470	2 622	2 602	2 609	2 578	2 591

Source: CSO, Czech Statistical Office 2014

In the past, most of the population was employed in agriculture and forestry, and small and medium enterprises were continuing being developed in the municipality. These were mainly tanneries, woodworking, fishing and glass-making businesses. After the German evacuation, Nové Hrady lost almost half of its population and most of the factories and businesses in the municipality were closed. At present, agriculture is no longer a crucial economic sector. In addition to farming, Nové Hrady also includes small business owners specializing particularly in tourism, woodworking, hairdressing, etc. (www.novehradyhistorie.cz).

Table 2 Number of citizens and average age in Nové Hrady (%)

	Nové Hrady	Czech Republic
Average age	40.3	40.6
Number of citizens up to the age of 29	35.13	33.13
Number of citizens over the age of 60	21.93	22.89
Number of citizens commuting to work and school	26.82	27.27
Number of citizens who are religious	18.15	20.78
Number of citizens of Roman Catholic faith	9.27	10.37
Number of citizens of evangelical faith	0.20	0.50

Source: CSO, Census of Persons, Houses and Apartments 2011

According to the census of persons, houses and apartments, in 2011 48% of residents in Nové Hrady were economically active. The level of unemployment in Nové Hrady was 8.21%. In the České Budějovice District the level of unemployment was 7.21%, in the Southern Bohemian Region 8.56% and 9.84% in the Czech Republic.

Two class 2 roads pass through Nové Hrady. A train station is located about 4 km from the centre of Nové Hrady and the train passes in the direction from České Budějovice to České Velenice. There is also a train station in Nové Hrady. The mayor of municipality is mayor who left his previous employment to work full time as the mayor.

3.2 Local political system

Four parties have been active the municipality for many years. They are Křesťanská a demokratická unie - Československá strana lidová (the Christian and Democratic Union - Czechoslovak People's Party (KDU-ČSL), Komunistická strana Čech a Moravy (the Communist Party of Bohemia and Moravia) (KSČM), Občanská demokratická strana (the Civic Democratic Party) (ODS) and Česká strana sociálně demokratická (the Czech Social Democratic Party) (ČSSD). In elections to the municipal council in 1994, representatives from the Democratic Union (DEU) ran. DEU did not receive a mandate and did not run in other local elections. The local political spectrum is complemented by two associations of independent candidates.

One of the two largest political parties in Nové Hrady was ODS. The Civic Democrats won the most votes in the municipal elections in 1994, 1998 and 2002. The post of mayor was held by an ODS candidate. The second political entity which won the most votes in the elections to the municipal council was the association of independent candidates,

[2] www.sdruzeniruze.cz

"Občané pro zdravé město" (Citizens for a Healthy Town) (hereinafter "OPZM"). This association prevailed during the elections in 2006 and 2010. The mayor was elected from amongst this independent association of candidates. Between the elections in 2002 and 2006 there was a shift in dominance between these two political parties (ODS and OPZM). Preference of political party ODS moved to OPZM, to the representative of an "independent" policy.

Table 3 Results of municipal elections in Nové Hrady

	1994		1998		2002		2006		2010	
	Votes (%)	Mandates	Votes (%)	Mandates	Votes (%)	Mandates	Votes (%)	Mandates	Votes (%)	Mandates
ODS	45.37	7	36.38	6	33.55	5	19.26	3	9.51	1
ČSSD	7.03	1	14.36	2	17.00	3	14.95	2	12.37	2
KDU - ČSL	17.01	3	8.76	1	9.91	1	6.78	1	3.40	0
KSČM	30.06	4	24.96	4	25.66	4	18.45	3	9.88	1
SNK Evropští demokraté	-	-	-	-	-	-	12.83	2	-	-
Demokratická unie	0.53	0	-	-	-	-	-	-	-	-
TOP 09	-	-	-	-	-	-	-	-	5.66	1
Strana za životní jistoty	-	-	0.61	0	-	-	-	-	-	-
Občané pro zdravé město	-	-	-	-	-	-	27.73	4	53.20	9
SNK 1	-	-	14.94	2	-	-	-	-	-	-
SNK 2	-	-	-	-	-	-	-	-	5.99	1
SN	-	-	-	-	13.88	2	-	-	-	-
Total	**100**	**15**	**100**	**15**	**100**	**15**	**100**	**15**	**100**	**15**
Voter participation in %	**70.90**		**53.11**		**52.77**		**53.72**		**65.90**	

Source: CSO, Czech Statistical Office 2014

Communists hold a relatively important position on the political scene in the municipality; yet their success during elections is decreasing. In 1994, 1998 and 2002 they always had four mandates; in 2006 they acquired three mandates and in 2010 only one mandate. ČSSD had a significant influence in the municipality, from which in 2006 factions split off headed by the current mayor - an association of independent "OPZM" candidates. The position of ČSSD has thus considerably weakened. Party spectrum in the municipality is completed by KDU-ČSL. This party regularly acquired one seat, but this "rule" was not repeated during the election in 2010.

In compiling the list of candidates in municipal elections, all political parties in the municipality act similarly. The leadership of the applying candidates asks to participate in the candidate list of municipality of "significant" and "helpful" people of the municipality (Interview No. 2). These are mostly people with no political affiliation. People who have participated in past elections are often approached.

3.3 Civic participation

Manifestations of civic participation are divided into political and non-political. The basic form of political participation in public life is voter participation. For this case study, voter participation in municipal elections is particularly relevant; voter participation in other elections also implies political participation. These results are then compared with nationwide participation in elections. Table 4 shows the voter participation in Nové Hrady and the Czech Republic in various types of elections.

As the table shows, the voter participation trend has more of a fluctuating character. The highest voter participation was recorded in 1994 during elections to the municipal council; at that time, participation in elections reached almost 71%. Such a high voter turnout has yet to be overcome. The increase in voter participation was recorded in the municipal elections in 2010. Voter participation of other elections in Nové Hrady almost corresponds to the national average. An exception is the second round of Senate elections in 1996 and 1998, in which voter participation was significantly lower in comparison with the Czech Republic. A characteristic feature of elections to municipal councils in the Czech Republic is a higher level of voter participation in smaller towns and cities, which include Nové Hrady.

We can obtain the most complete picture of political participation of citizens from the assumption that we can subsequently combine the basic data on voter participation and party affiliation of all candidates and elected representatives

with other data. In terms of applying passive suffrage, Table No. 7 focuses on the structure of candidate lists according to the age and sex of the candidates. The data in the table indicates the nearly constant average age of candidates. The proportion of candidates under the age of 45 (i.e. the national average age of candidates in municipal elections) is around 40%. Almost identical is the average age of municipal councils. A decreasing trend was observed for representatives of municipalities under the age of 45.

Table 4 Voter participation in Nové Hrady and the Czech Republic (v%)

Elections		**1994**	**1996**	**1998**	**2000**	**2002**	**2004**	**2006**	**2008**	**2009**	**2010**	**2012**	**2013**
Municipal Council	Nové Hrady	70.90		53.11		52.77		53.72			65.90		
	Czech Republic	60.68		45.02		45.54		46.32			48.48		
Regional council	Nové Hrady				35.56		29.27		43.23			40.18	
	Czech Republic				33.64		29.62		40.30			36.89	
PČR Senate *	Nové Hrady		25.84 26.13	48.34 12.52							48.59 21.12		
	Czech Republic		35.03 30.63	42.37 20.36							44.59 24.64		
Chamber of Deputies	Nové Hrady		72.00	68.20		54.79		60.76			59.65		59.04
	Czech Republic		76.41	74.03		58.00		64.47			62.60		59.48
European parliament	Nové Hrady						24.34			22.17			
	Czech Republic						28.32			28.22			
President of the Czech Republic *	Nové Hrady												59.66 56.92
	Czech Republic												61.31 59.11

* first and second round of elections

Source: own processing based on data from CSO

The proportion of women in the total number of candidates and representatives corresponds to the countrywide average. The exception is 2010, when the average number of female candidates and representative in the municipality slightly exceeded this limit.

Table 5 Overview of basic data on the application of active and passive suffrage of citizens in Nové Hrady

	1994	**1998**	**2002**	**2006**	**2010**
Candidate lists	5	6	5	6	7
Number of elected representatives	15	15	15	15	15
- Elected women	2	3	4	1	5
Average age of representatives	47	47.73	50.27	47.27	48.27
Representatives up to the age of 45	40%	33.33%	26.67%	53.33%	26.68%
Number of candidates	55	76	75	90	105
Number of women candidates	9	15	20	26	35
Average age of candidates	46.98	46.04	49.27	47.99	46.53
Candidates up to the age of 45	38.19%	47.37%	36%	35.55%	40.96%
Authorized voters	1 873	1 992	2 037	2 044	2 085
Voter participation	70.90%	53.11%	52.77%	53.72%	65.90%
Candidates/authorized voters	2.94%	3.82%	3.68%	4.40%	5.04%
Candidates/representatives	3.67	5.07	5	6	7

Source: own processing based on data from CSO

Under the conditions of municipal politics, the degree of political participation can also be assessed through citizen participation during council meetings. Council meetings are regularly attended by only a few people from the municipality. Participation increases only if a serious subject for the citizens is to be discussed.

Civic participation can also take various forms of protest. This could mean a petition or civil resistance. Sometimes these initiatives may result in participation in elections in the form of an association of independent candidates (Čmejrek, 2009). This has not yet happened in Nové Hrady.

Apolitical participation is about involving citizens in public life in the municipality. Usually, this form of participation is considered activities related to federal and leisure activities (Čmejrek, Bubeníček & Čopík, 2010). Federal life in Nové Hrady has in particular a social function. Interest organizations apply political functions only minimally. Despite the fact that there are a number of associations in Nové Hrady, none of them are significantly involved in political life in the municipality. People accept interest organizations rather as an opportunity to pursue their interests through participation in public life in the municipality (Interview No. 3).

One of the most active clubs in Nové Hrady is the association of volunteer firefighters, which was founded in 1874. Currently, the volunteer firefighters have 38 members.[3] Volunteer firefighters cooperate in preventing fires and other similar undesirable phenomena (Kavan & Dostál, 2012). In addition to providing assistance to citizens in crisis situations, volunteer firefighters organize many social activities and competitions.

A hunting association has existed in the municipality for over 50 years. The association operates in the leased hunting grounds of the Hunting Fellowship of Nové Hrady, which has a total area of 4,295 hectares. The hunting association currently has 55 active members.[4]

The municipality also has the following organizations: a local organization of the Czech Fishing Union of Nové Hrady, TJ Sokol Nové Hrady, Association of Multipurpose Sports and Activities, the Czech Union for Nature Conservation of Nové Hrady and Military History and Techniques Club of Nové Hrady.[5] All of these clubs and associations share a common feature, and that is a loss of interest in membership. A gradual aging of the membership base is occurring and the interest of young people in participating in clubs is decreasing (Interview No. 1).

In 1999 a civic association called Novohradská Civil Society was established in Nové Hrady. The aim of organization is to contribute to the development of the Novohradske Mountains area through cultural, social and sporting events and local projects, and at the same time to strengthen the foundations of civil society.[6]

The town Nové Hrady is a member of the Silva Nortica Euro region. The Euro region is a very important institution for cross-border cooperation between the Southern Bohemian Region and the Waldviertel Region, Lower Austria. The Czech part of the Euro region has 48 members, one of which is the town of Nové Hrady.[7] Nové Hrady is also a member of the local Rose Association Action Group.

4 Conclusions

The Southern Bohemian town Nové Hrady has around 2,500 inhabitants. The political spectrum in the municipality is relatively stable. Four parties have been active here for many years: the Civic Democrats, Christian Democrats, Social Democrats and Communists. ODS has always achieved the best results during elections, except for in 2006 and 2010. In these years, the association of independent candidates “Citizens for a Healthy Town” won the election. Like other municipalities of similar size, political parties and associations do not have a strong influence on citizens during municipal elections. During elections, citizens tend to identify with the personality of the candidate rather than to favour a particular political party or association. Most candidates (with the exception of the Communists) do not have a political affiliation.

Public life in the municipality is not encountering a completely lukewarm approach, although active members in associations are decreasing. The volunteer firefighters and hunting associations hold significant positions in the municipality. These associations do not impact political life in any way. The problem of interest groups is usually the high age of active members and lack of interest from younger persons.

The municipality is also part of the Silva Nortica Euro region and Rose Association local action group. Through cooperation Nové Hrady is acquiring funds for the implementation of various projects.

No significant conflicts are taking place in Nové Hrady. Thee population of the municipality is nationally, religiously and ethnically homogenous. Conflicts do not occur in the municipality even with regard to different age groups, local and immigrant populations.

[3] www.sdhnovehrady.webnode.cz
[4] www.myslivecky-spolek-nove-hrady.webnode.cz/
[5] www.kicnovehrady.cz
[6] www.novnos.cz
[7] www.novnos.cz

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Some Evidence on Continuing Integration in the European Union from the Perspective of Trade and Factor Mobility Measures: a Cluster Analysis Approach

Petr Rozmahel, Ladislava Issever Grochová, Luděk Kouba[1]

Abstract*: The paper aims at providing some evidence at current level of homogeneity and convergence among the EU states from the perspective of trade and factor mobility measures. In particular, the paper examines whether the EU countries make internally homogenous clusters and to what extent they differ. Also the convergence or divergence tendencies among pre-determined clusters of the EU core, periphery and new EU countries comprising of the CEE countries are analysed and assessed. Finally, the paper intends to shed some light on contribution of the periphery and CEE countries to rising or decreasing heterogeneity in the European Union from the perspective of selected trade and factor mobility measures comprised in the dimension of Single market and openness. The cluster analysis, particularly the agglomerative Ward method with squared Euklidean distance, is the main research method. The results show that the EU countries differ to a small extent and disparities among them have been diminishing from the perspective of trade and factor mobility over the integration period.*

Key words: European Integration · Convergence · Cluster Analysis · Foreign Direct Investment Intra-Industry Trade · Labour Mobility

JEL Classification: F14 · F15 · F22

1 Introduction

Despite ongoing discussion on benefits of the EU and Euro area membership due to current overall economic stagnation and debt crisis, the process of European integration is still continuing. In 2013 Croatia joined the European Union. In 2014 and 2015 Latvia and Lithuania enlarged the Euro area respectively. Poland has declared adopting Euro as its current macroeconomic priority, which makes this country a next potential candidate for the Euro area membership. Other new member states including mainly the Central and Eastern European (CEE) countries still consider the costs of Euro adoption to exceed the benefits regarding current economic circumstances in Europe and the worldwide. Considering further enlargement of the Euro area, the insufficient level of macroeconomic policy harmonisation and economic synchronisation are the main arguments for postponing the monetary unification process as repeatedly claimed by the euro area candidate countries' officials.

Apart from efficiency of common monetary union, the similarity of countries' economic performance as well as inner similarity of the member economies are considered as important factors for effective functioning of the European Union.

Alesina et al. (2005) state that countries of the European Union should be homogenous to exploit the economies of scale or externality internalisation as a positive outcome of integration. Cappelen (2003) reminds that greater equality across Europe in income and productivity has become one of the central objectives of the European Community since the early days of European economic integration. Trichet (2013) considers the recently adopted legislations on the macroeconomic Imbalance Procedure (MIP), the Fiscal Compact introduced in the Treaty on Stability Coordination and Governance (TSCG) or the Europlus Pact to lead to a remarkable progress in coordination of the EU governance. All the procedures and treaties mentioned above support the convergence of individual economies end should prevent form asymmetric shocks within the EU and Euro area in particular. Regarding similarity and homogeneity within Europe, one should mention that the major part of the EU budget consolidated in the structural funds is aimed at reducing inter-regional disparities across the EU.

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Regarding the call for homogeneity and similarity of states by the EU officials as well as the literature our paper aims at providing some evidence at current level of homogeneity and convergence among the EU states from the perspective of trade and factor mobility measures. The selected indices of trade and factor mobility are comprised within the dimension labelled as Single market and openness. The paper examines whether the EU countries make internally homogenous clusters and to what extent they differ. Also the convergence or divergence tendencies among predetermined clusters of the EU core, periphery and new EU countries comprising of the CEE countries is analysed and assessed. Finally, the paper intends to shed some light on contribution of the periphery and CEE countries to rising or decreasing heterogeneity in the European Union from the perspective of selected trade and factor mobility measures comprised in the dimension of Single market and openness. The central idea and methodology of the paper follows a large research by Rozmahel et al. (2013).

The paper is structured as follows. After the introductory part explaining motivation of research the main methods and data are explained in the second section. The third section presents the results of the static and dynamics analysis, which were applied to identify the clustering structures in the EU in selected years and also to identify the convergence or divergence tendencies among the country clusters. The third part includes also the sensitivity analysis. The fourth section concludes.

2 Methods

Aiming at identifying internally homogenous clusters of countries and their changing structures over time we employ the cluster analysis as the main research method. In particular, following the study by Sorrensen and Gutierrez (2006) we apply the agglomerative Ward method with squared Euklidean distance in other take into account the internal homogeneity as well as the outliers. There are also many other studies applying the cluster analysis in slightly different modification when examining various aspects of European integration process such as Artis & Zhang (2001), Boreiko (2003), Camacho et al. (2006, 2008), Song & Wang (2008) and Quah & Crowley (2010).

The clustering structures were identified in years 2000, 2004, 2008 and 2011 to capture changes in the pre- and after-accession periods including the crisis year 2011. In addition, the evolution of the average distances in dendrograms and their variances are measured and compared to examine dynamics of clustering development in the EU. For the dynamic analysis the EU country clusters were pre-determined to study the convergence among clusters and contribution to the overall heterogeneity development from the perspective of Single market and openness dimension. The country-clusters were divided as follows: the EU core countries consists of Austria, Belgium, Germany, Finland, France and the Netherlands. The EU periphery includes Greece, Ireland, Italy, Portugal and Spain. Finally, the new EU countries involve the Czech Republic, Hungary, Poland, Slovenia, Slovakia and the Baltic countries Estonia, Latvia and Lithuania. Regarding the focus on dimension of Single market and openness, the measures of trade and factor mobility were selected for the analysis. Highly correlated variables, as suggested, e.g., by Dormann (2012), were excluded from the final list of variables to avoid the multicolinearity problem. The final list of indicators of the Single Market and Openness dimension is reported in the Table 1.

Table 1 Indicators of the Single Market and Openness Dimension

Variable	Abbreviation	Unit	Source
Intra-European trade	IET	%	Eurostat
Grubel-Lloyd index	GL	%	Eurostat, own calculations
Market integration - Foreign Direct Investment intensity	FDI	%	Eurostat
Labour migration	LM	%	Eurostat

Source: Authors

The idea of European integration to create a common market is addressed by the Single market and openness dimension. In particular, the Intra-European trade (imports and exports of goods and services as a percentage of total trade of goods and services) and Intra-Industry trade are used to tackle the issue. While the first is a classical measure of total trade intensity between a studied EU country and the rest of the EU, the latter is suggested by Fidrmuc (2004), Kandogan (2006) or Gabrish (2009) who claim that synchronizing of business cycles is primarily determined by the trade linkages measured by the Grubel Lloyd index (*GL*) rather than their intensity.

$$GL_{it} = 1 - \frac{\sum_i \sum_k \left| X_{it}^k - M_{it}^k \right|}{\sum_i \sum_k \left| X_{it}^k + M_{it}^k \right|}, \quad (1)$$

GL_{it} represents a ratio of the absolute value of intra-industry trade to total foreign trade. X^k_{it} and M^k_{it} are the values of exports and imports of the k^{th} commodity produced in the i^{th} country in the time period t.

Besides the trade within the EU, the general openness of the EU countries represented by Foreign Direct Investments (as a percentage of GDP) and Labour Migration (a percentage of foreigners working in a particular EU country)[2] are used.

Consequently, all variables (see Table 1) were transformed into an index I which represents the i^{th} country's position relative to the rest of the EU countries using the following formula:

$$I_{i,t} = \frac{v_{i,t}}{\frac{\sum_{j=1}^{n} w_j v_j}{\sum_{j=1}^{n} w_j}} \quad (2)$$

where v represents the transformed variable, i stands for the i^{th} country in the time period t, denominator is the weighted average of the variable v_j for $i \neq j$, weights w_j being the j^{th} country's GDP. Index I can be used to describe the contribution of the i^{th} country to the level of heterogeneity within the EU. It then provides the information on a country's distance to the average of the remaining EU countries which reflects the degree of heterogeneity in the integration process.

As the indices can range from zero to theoretical infinity, all indices were normalized applying the formula:

$$N_{it} = \frac{I_{it} - MIN(I_T)}{MAX(I_T) - MIN(I_T)}, \quad (3)$$

to preserve the equal impact of all indices. Where I is the value of the index for the i^{th} country in time period t. $MAX(I_T)$ and $MIN(I_T)$ represent maximum and minimum value of the index during the whole time span T, respectively.

Once the variables are transformed cluster analysis based on agglomerative Ward method with squared Euklidean distance is performed. The principles of the Common European Market have led since their adoption to elimination of many barriers to free trade. Therefore, we expect a remarkable openness of the EU countries and highly integrated trade within the EU and so low average distance and variance of clusters estimated.

3 Research results

The empirical part is divided into two parts – the cluster analysis showing the dis/similarity of the EU countries and convergence/divergence issue based on the clusters' average distance. The results of the study are supported by sensitivity analysis.

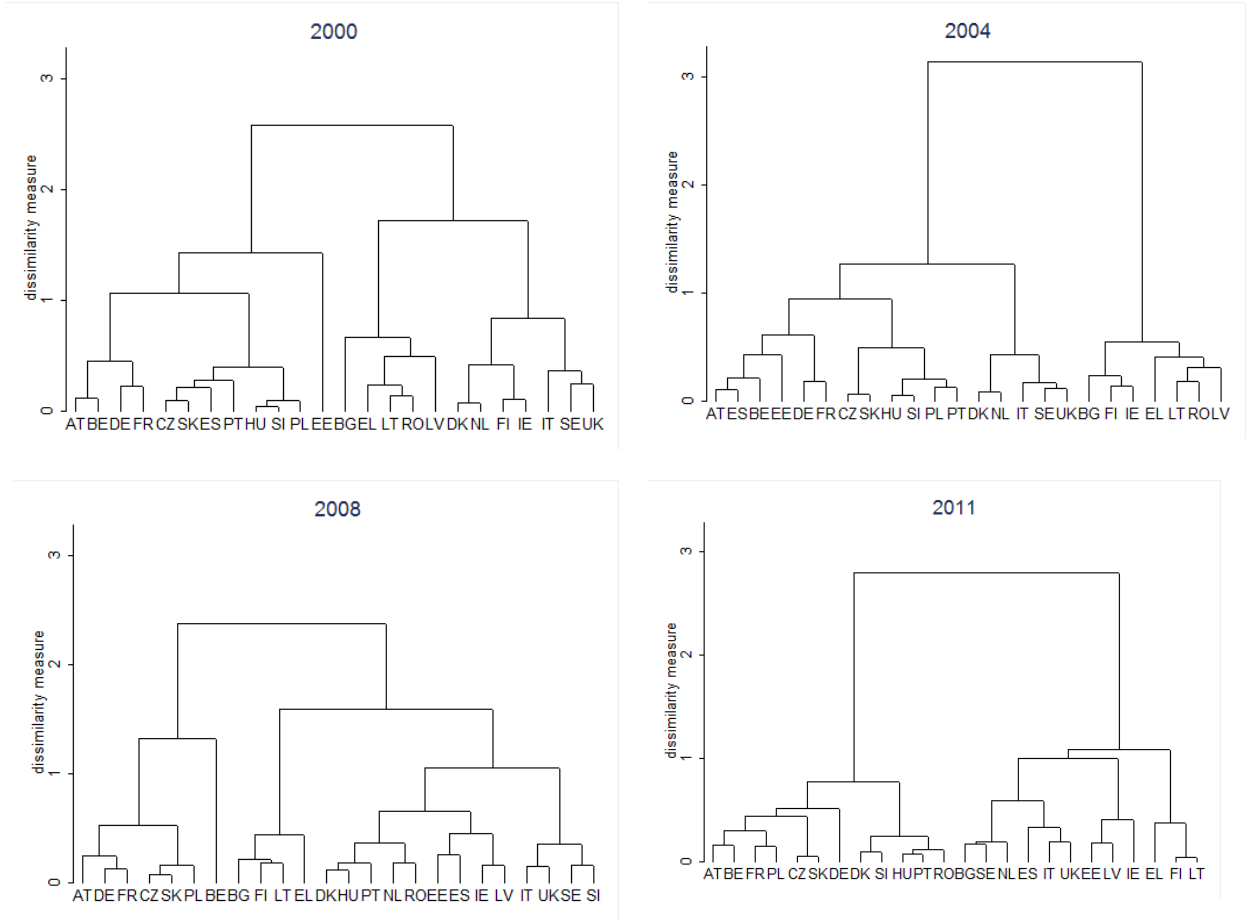
3.1 Identification of the EU country-clusters from the perspective of Single market and openness measures

Figure 1 shows the estimated clusters of the EU countries with respect to the dimension of Single market and openness. The years examined are those that represent pre- and post-accession period, economic crisis and post-crisis period. Low heterogeneity is expected as the Principles of the Common European Market came to existence in 1992.

As anticipated the differences in distances among the EU countries are small, especially in the pre-enlargement and pre-crisis period. Moreover, no clear identification of commonly named groups of countries as core, periphery or the CEE countries cannot be unambiguously identified. Nevertheless some common patterns can be observed. While Finland, Ireland and the Netherlands are characterized by relatively low intra-industry and intra-EU trade their opposite counterparts among the CEE countries are Poland and Slovakia which shifts them towards the core countries. Regarding the CEECs, even if they do not create a homogenous cluster their average distance decreases over the period analysed which is the evidence of integration in trade linkages among the core and CEECs. As there are small differences among countries, the clusters are sensible to even small changes in variables which makes them unstable over time.

[2] The measure capturing all foreigners in the EU countries was finally used due to low data availability of intra-EU labour mobility indicators.

Figure 1 Clustering in the dimension of Single Market and Openness

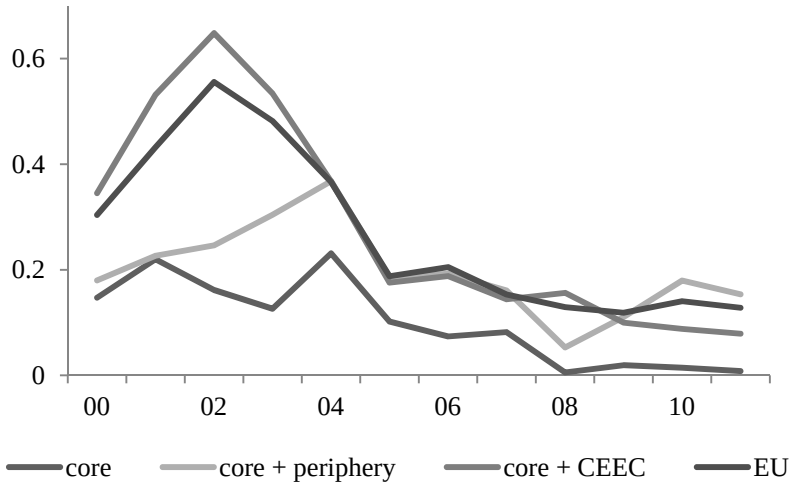


Source: Authors' calculations

3.2 Dynamic analysis. Convergence of pre-determined EU country-clusters

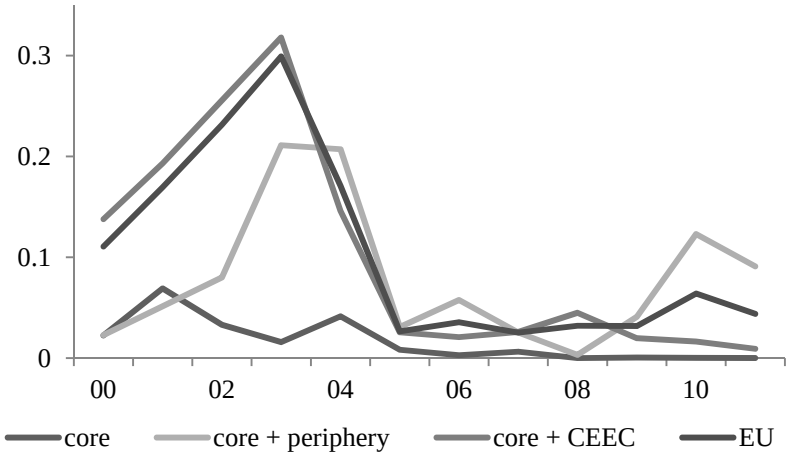
The second part of the empirical analysis aims at assessing the evolution of the homogeneity level over time. The estimated averages of distances within pre-determined clusters can be regarded as a measure of homogeneity where low distance means low differences among Single Market and Openness features and so higher level of homogeneity, and *vice versa*.

Figure 2 Average distances in clusters



Source: Authors' calculations

Figure 3 Variances of distances in clusters



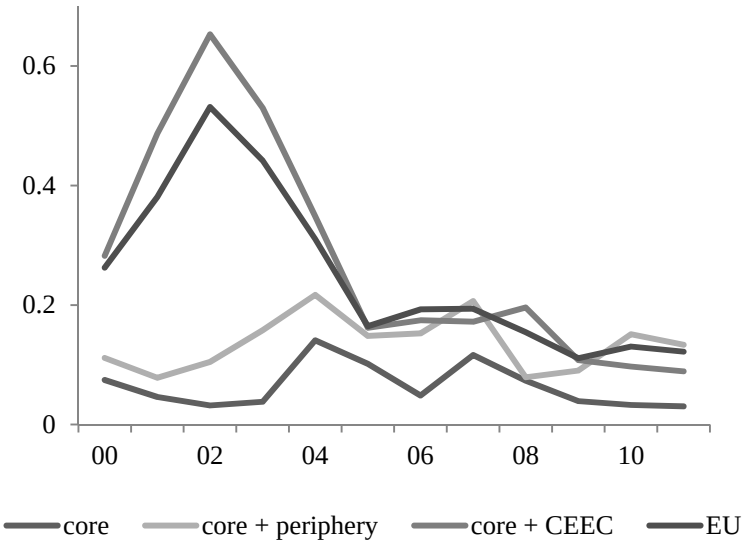
Source: Authors' calculations

As shown in the Figure 2 and 3, average distances among the clusters diminish. Starting from the core countries, they are estimated as highly homogenous during the whole period of time. Regarding the CEECs, they arise the average distance of the core+CEEC group so we can claim that the enlargement increased heterogeneity mainly till the 2005. Since then the whole EU is very homogenous till the end of 2007. The dispersion is caused by Belgium and Austria in which we can observe a sharp increase in FDI. Another resource of the EU heterogeneous movement came from periphery countries mainly due to the FDI intensity and Labour migration issues. On the contrary, the CEECs since 2009 have contributed to heterogeneity reduction as they adjusted the trend of the core countries.

3.3 Sensitivity analysis

The sensitivity analysis is used to check the robustness of results. In particular, we examine how the results of clustering and their evolution are stable.

Figure 4 Sensitivity Analysis: Average distance in clusters in adjusted dimensions



Source: Authors' calculations

Excluding the Labour Migration measure from our set of variables, no significant change in results compared to the original ones can be observed in cluster and dynamic analysis. The clustering structure remains almost unchanged. Even the role of the CEECs and periphery countries in the convergence process within the EU is quasi identical to the original one.

4 Conclusions

The results of the research did not confirm the traditional division among core, periphery and new EU countries from the perspective of trade and factor mobility measures. The clustering structure is unstable over analysed years. Only slight shift of Finland, Netherland and Ireland out of group of the old EU countries and convergence of Poland and Slovakia towards this group is observable in the dendrograms. Also the overall heterogeneity level seems to be declining since as the distances among countries and clusters seem to decline. This is actually confirmed in the following dynamics analysis. The average distances among clusters diminish and tend to the minimum of zero. Since 2007 divergence of the EU periphery from the core countries is apparent. Contrary to the EU periphery, the CEE countries have contributed to heterogeneity reduction as they adjusted the trend of the core countries since 2009. The sensitivity analysis confirmed the stability of results. In general, the EU countries differ to a small extent and disparities among them have been diminishing from the perspective of trade and factor mobility over the integration period. Further research testing for heterogeneity of countries from other socio-economic dimensions might contribute for providing a broader picture of the internal EU heterogeneity and its development over time.

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Financial Characteristics and Classification of Production Companies Grouped by Relevance of the Logistic Metric

Jaroslava Pražáková, Martin Pech, Petra Kosíková[1]

Abstract*: The main aim of the paper is to present the classification of production companies created on the basis of the logistic metric. Companies are grouped into clusters by (with) relevance of the logistic metric dimensions. In the paper two of the most popular clustering techniques are presented in the framework of the data recovery approach (agglomerative hierarchical clustering and k-means for partitioning). The basic characteristics of explored companies are used for juxtaposition of the separated clusters. In results four clusters of production companies are presented: Cluster of up and down stream cooperation companies, Cluster with Companies focused on down-stream cooperation, Cluster with companies focused on reporting by indicators and Cluster of companies which consider indicators are not important. Results bring new questions and direction for further research on demonstration of the dependence between logistic indicators monitoring, information sharing and financial performance of the companies.*

Key words: Supply Network · Information Flow · Finance Indicators · Cluster Analysis · Logistic Metrics

JEL Classification: L60 · L14 · M21

1 Introduction

Understanding the link between supply chain performance metrics and the overall metrics used to measure the company's financial performance is essential to align Supply Chain processes' performance to the company's financial strategic goal (Elgazzar, Tipi et al. 2012). Many researchers have proposed various performance measurement systems to measure supply chain performance. However several criticisms were raised against these systems. Amongst the most widely highlighted criticisms of current performance measurement systems in supply chain management are: the failure to make integration between financial and non-financial measures and the lack of system thinking (Chan 2003). The challenge for many companies is that the alignment of performance measurements between supply chain and financial functions is still rather poor (Elgazzar, Tipi et al. 2012).

The main reason for this is that supply chain performance metrics and financial performance metrics are defined in different ways which creates difficulty to translate supply chain operational measures, with their focus on day to day operations, into financial targets (Camarinelli & Cantu 2006). Many times is possible to see, that companies use particular parts of financial performance indicators as a core structure for their logistic metrics. On the other hand, the process very often runs in both directions. The Supply Chain Reference Model (SCOR Model) can be stated as a one of the most common used examples of mentioned phenomenon (Poluha 2007).

In the case of Czech companies, researchers very often find that especially small and middle sized companies do not deal with this problem. Work on the long-term plans and strategies creating were often destroyed during the ongoing economic crisis and its aftermath. Companies changed the routine management practices and instead of development activities they focused on costs reductions and maintaining of existing market positions. Development activities become very rare and carried out only in exceptional cases. That is the main reason why the presented research is focused strictly on logistic metric used in almost every Czech production companies and is permanently and long-term monitoring, and not on the detection systems evaluating supply chain management as a whole, which is mostly related to substantial investment in the development of internal information systems and systems used for interconnecting the Tier 1 Suppliers and Tier 1 Customers (commonly on supply chain interfaces). The presented paper aims to answer whether it is even possible to determine the classification of the Czech production companies with respect to their prevalent dimension of logistic metric and whether it at least partly depends on the size of company, financial situation or categorization of industry.

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2 Material and methods

The main aim of the paper is to present the classification of production companies created on the bases of the logistic metric. Companies are grouped into clusters with relevance to the logistic metric dimensions. Afterwards the main cluster characteristics with regard to company size, industry categorization and financial features are determined.

2.1 Cluster Analysis

Cluster analysis divides data into groups (clusters) that are meaningful, useful or both. The goal is that the objects within a group are similar (or related) to one another and different from (or unrelated to) the objects in other groups. The greater the similarity (or homogeneity) within a group and the greater the difference between groups, the better or more distinct the clustering is (Tan, Steinbach et al. 2006). The cluster analysis allowed the separation of 93 explored companies into groups based on the correlation found between logistic metric dimensions. Used logistic metric dimensions are divided into five main groups (Pech & Smolova 2010, 2011):

- New supplier selection (N),
- Evaluation of suppliers (E),
- Storage (S),
- Customers (C),
- Transport (T).

Two clustering methods are used in paper: agglomerative hierarchical clustering (AHC) and *k*-means clustering. Hierarchical clustering is the major statistical method for finding relatively homogeneous clusters of cases based on measured characteristics. It starts with each case as a separate cluster, i.e. there are as many clusters as cases, and then combines the clusters sequentially, and reducing the number of clusters at each step until only one cluster is left (Burns & Burns 2009). The clustering method uses the dissimilarities or distances between objects when forming the clusters (in paper it is Euclidean, Bhattacharya, Mahalanobis and Manhattan distance). *K*-means clustering is a method for finding clusters and cluster centres (called centroids) in a set of unlabelled data. One chooses the desired number of cluster centres, say *k* and the *k*-means procedure iteratively moves the centres to minimize the total within cluster variance (Hastie, Tibshirani et al. 2009). The *k*-means algorithm uses information about the desired number of cluster (obtained by AHC).

2.2 Companies and cluster characteristics

The basic characteristics of explored companies are used for juxtaposition of the separated clusters: for example company size (according to EU terms) and company industry categorization. The available data were obtained from Albertina database. More than 20 common used financial indicators were calculated to set detailed specification of the clusters (ie. indicators of profitability, solvency, liquidity, stability, other indicators). On the basis of available data on 93 Czech production companies from the 5 years period (from 2009 to 2013), only seven indicators were selected for depiction of the clusters. These indicators are defined as follows:

Days in inventory[1]: The indicator represents the number of days in the period divided by the inventory turnover ratio. We calculated it on an annual basis. This formula is used to determine how quickly a company is converting their inventory into sales. A slower turnaround on sales may be a warning sign that there are problems internally, such as brand image or the product, or externally, such as an industry downturn or the overall economy.

Days' Sales Outstanding (DSO): A measure of the average number of days that a company takes to collect revenue after a sale has been made. A low DSO number means that it takes a company fewer days to collect its accounts receivable. A high DSO number shows that a company is selling its product to customers on credit and taking longer to collect money. We calculated this formula only with business receivables.

Creditors payment period (days): The Creditor Payment Period is a 'performance ratio' and it indicates the efficiency of a business. Efficiency and performance are linked, as efficient businesses are usually more profitable.

Value added per one employee (in thousands of CZK per month): Added value is the positive difference between sales prices of goods with purchasing prices of goods purchased to produce goods (Müftüoğlu in Savas, Özer et al. 2002). The indicator is calculated as a ratio of value added of the company and recalculated average number of employees.

Share of equity to total capital (in %): The term equity is used for the value of owner interest in company. It is the opposite value of overall indebtedness. Table X presents the share of equity to total capital in per cents.

[1] FinanceFormulas.net. *Days in Inventory* [online]. Available on web: http://www.financeformulas.net/Days-in-Inventory.html

Ratio of business receivables to total assets (in %): Only short term business receivables were used for construction of this indicator, which might be used as indicator for potential risk of insolvency due to high share of not paid receivables.

Ratio of inventory to total equity (in %): this indicator is very important due to making an effort of almost every company against immobilisation of liquid funds. Low ratio of inventory is good sight which shows well function of current assets management.

3 Research results

Companies with high positive correlations are grouping together and segregate from those with negative correlation. Because we usually don't know the number of clusters that will be optimum for our sample, two stage cluster analysis is used.

3.1 Agglomerative hierarchical clustering (AHC)

The purpose of AHC in paper is to determinate number of desired clusters for k-means clustering phase. In agglomerative hierarchical clustering we link more and more companies together and create larger and larger clusters of increasingly dissimilar elements. After the last step, all companies are joined together as one cluster. The companies (rows) are clustered according to the dimensions (average values of dimensions). Result can show a hierarchical tree diagram (dendrogram). Distance among objects (companies) can be measured in a variety of ways. All clustering algorithms have the measurement of mathematical distance between observations as their primary purpose. The XLStat software that we use include for example: dissimilarity criterion Euclidean distance, Aggregation criterion Ward's method and data have been standardized by columns. For this case, the proposed method employs classification of four clusters. The automatic truncation is (manual of XLStat software) based on the entropy and tries to create homogeneous groups.

Table 1 Number of clusters according to automatic truncation function

Dissimilarity criterion	Number of clusters according to aggregation criterion		
	Single linkage	Strong linkage	Ward's method
Euclidean distance	>5	4	4
Bhattacharya distance	>5	4	4
Mahalanobis distance	5	4	4
Manhattan distance	4	4	-

Source: software XLSTAT

In Table 1, the results of three aggregation criterions (single linkage, strong linkage, Ward´s method) in conjunctions with several dissimilarity methods, such as Euclidean, Bhattacharya, Mahalanobis and Manhattan distance are depicted. The result of single linkage for Euclidean and Bhattacharya distance brings too many clusters, so we insert " >5 " as number of desired clusters into the table. There might be no definite or unique answer the question: How many groups are optimal? We used result of number of clusters with the highest frequency. Four clusters are also chosen for next phase of k-means clustering as optimal.

3.2 K-means clustering

The k-means method refers to simple technique, which begins with choose *k* initial centroids (in our paper, it is four according to result of AHC), which specify the number of clusters desired. The centroid of each cluster is then updated based on the points assigned to the cluster. This type of clustering is iterative. So we repeat the assignment until the centroids remain the same in order to choose the optimal solution.

Table 2 Number of clusters according to automatic truncation function

Variable	Analysis of Variance				Cluster Means			
	Between class	Within class	*F*	*p*	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Evaluation of suppliers (E)	0.4257	3.4081	5.4956	0.0056	**0.7267**	**0.6254**	**0.7101**	0.2019
New supplier selection (N)	1.4679	4.3719	14.7728	0.0000	**0.5179**	**0.7373**	**0.7868**	0.0969
Customers (C)	6.7077	2.2813	129.3717	0.0000	**0.6905**	0.1584	**0.7381**	0.3681
Storage (S)	0.5283	2.4535	9.4740	0.0002	0.2710	0.1920	0.3282	0.1396
Transport (T)	2.4831	4.6620	31.5194	0.0000	0.2359	0.2053	**0.6243**	0.3047

Source: Statistica software

In the paper, the *k*-means clustering method has following parameters entered in software Statistica: number of clusters = 4; iterations = 10 and data have been standardized by columns. The distances between the objects and the *k* centers are calculated and the objects are assigned to the nearest centres. Table 2 shows results of clustering and basic statistical characteristics of gained clusters. Initial centroids are redefined from the assigned objects to the various classes. According to analysis of variance, all variables are significant (table 2, column "*p*").

For more illustrative description of clusters characteristics, the cluster means are examined. Table 2 contains average values in the last four columns clusters which have different features expressed by dimensions. Strong linkages of dimensions to clusters are depicted in bold (the values higher than 0.5). We have identified one specific cluster with very strong linkages to all evaluated dimensions (cluster 3), cluster with weak linkages (cluster 4) and two clusters that have partial strong dependence on evaluation of dimensions (cluster 2 with Evaluation of suppliers, New supplier selection and in case of cluster 1 linkage to Customers dimension too).

3.3 The characteristics of the particular clusters

Based on cluster analysis four different groups of companies focused on the most used logistic indicators are determined. The characteristics of the particular clusters follow.

Cluster 1. The cluster consists of 27 companies (it represents 29% of all examined companies). More than 45 % of all these companies are focused on engineering (almost 50% of all asked engineering companies). Seven members of this cluster fulfil EU terms for big companies and the others are small and middle sized companies. 18 companies, more than one third of asked consumer goods producers is the next important group in the cluster 1. Remaining companies are from others asked groups of production companies. More than 52% of all big companies through the all asked branches are grouped in cluster 1.

Average number of employees in cluster 1 is 228 and the value added per one employee exceeds 63 thousands of CZK every month (see Table 3). Cluster 1 seems to be the strongest in terms of economic effectiveness, however more than 23 % of its members is in the red. Cluster 1 is strange, among the others, because the best reached values of inventory turnover (22 days), days` sales outstanding (36) or Inventory to total equity (6.5%).

Almost all these companies are interconnected to more than 2 well organised supply networks often with foreign activities. Supplier partnerships and strategic alliances refer to the co-operative and more exclusive relationships between organisations and their upstream suppliers and downstream customers (Gunasekaran, Patel et al. 2004). That is one of the reasons for such significant monitoring of logistic indicators focused on up and down stream cooperation.

With respect to finding results, it is possible to say, that almost big companies are focused on up and down stream cooperation regardless of branches. Storage and transport are not usually so important with respect to using of outsourcing or subcontracts. Other reasons for less importance of storage and transport indicators for this group of companies are: very specific and narrow production program or job-order manufacturing. On the other hand, there is a big group of SME's too. This group of companies is very often close to customers and their production consists mainly of job-order manufacturing. Companies belonging to the cluster are strictly oriented on up and down stream cooperation.

Table 3 Clusters characteristics

Indicator	**Cluster 1** (*n* = 27)	**Cluster 2** (*n* = 32)	**Cluster 3** (*n* = 26)	**Cluster 4** (*n* = 8)
Days in inventory	21.877	37.393	31.465	**12.742**
Days' Sales Outstanding	36.037	82.313	54.846	**40.875**
Creditors payment period	47.259	58.219	49.654	**65.500**
Value added per one employee (thousands of CZK per month)	63.259	24.313	27.346	**19.000**
Share of Equity to total capital (%)	**44.450**	**45.259**	**50.034**	**38.25**
Ratio of business receivables to total assets (%)	17.239	22.369	23.389	**6.46**
Ratio of inventory to total equity (%)	6.529	11.853	9.827	**12.82**

Source: authors

Cluster 2. Second cluster is composed of 32 production companies. It includes enterprises concentrated on production of consumer goods (almost 30% of the cluster), building companies (26% of cluster 2 companies) and engineering industry (18% of cluster 2 companies). Only 5 of these 32 companies fulfil EU terms for big companies. Average number of employees is the lowest of all determined clusters and above that it reaches Value added per one employee only 24 thousands of CZK (only 38% of the cluster 1 value).

The cluster includes enterprises with stable economic condition. Only 12% of them were in red in observed five years period and it was only 1 company that does not show the profit in first quarter of this year.

Value of average Inventory turnover exceeds 37 days and maximum value in the cluster is 63 days. This value was reached by the company with very specific production program depending on deliveries from Southern Asia. The indicator Average Days` sales outstanding displays potential problems with customer payments (20% increasing in last 2 years). It might be partly caused by financial problems of all economy, however another clusters do not show similar effects.

Suppliers are very important especially for SME's, these companies have only week bargain power to their suppliers, and on the other hand these companies are very sensitive to delivery price. They are oriented on quality of deliveries (for example buying materials and semi-finished products), customers and good downstream cooperation.

Cluster 3. Third cluster is composed of 26 companies mainly from food production sector (54%) and engineering companies (19%). More than 190 employees is average value of this cluster, which companies are focused on reporting by indicators in each of five dimensions.

There are two main groups of companies: First of them concentrates big companies with sophisticated evaluation systems of process and performance indicators. They have operated many years on the market or they are subsidiaries of traditional companies. Supply chain integration is needed to manage and control the flow in operating systems. Such flow control is associated with inventory control and activity system scheduling across the whole range of resource and time constraints. Supplementing this flow control, an operating system must try to meet the broad competitive and strategic objectives of quality, speed, dependability, flexibility and cost (Toni & Tonchia 2001). These big companies are mainly from food and engineering industry. Second group of companies are new firms, which try to create new information system for performance or process evaluation. This first step of information system creating brings time period, when companies monitored big amount of information and will precise their information system in future (Pech & Smolova 2011).

This cluster has big potential to sharing information in supply chain on condition that method of calculation sustains identical. Members of this cluster have the highest share of equity to total capital (average value 42.3%). Regarding the structure of the cluster, it is not surprising.

Cluster 4. This cluster is composed only of 8 companies. It does not carry too much information about specification of these companies due to their low number. In addition, four companies show long term loose and with respect to their size, they are not obliged to present all financial figures. Companies monitored only a few indicators, which are connected with accounting. Reasons for not using many indicators of these five dimensions are: very specific and narrow production portfolio (only 2 of 3 different products), short-run production system, and orientation on providing services (especially transport companies).

4 Conclusions

To the conclusion we present the classification of production companies created on the bases of the logistic metric. As an effect of cluster analysis four clusters with the following generalised descriptions are isolated: Companies in the Cluster 1 seem to be the strongest in terms of economic effectiveness. Almost all these companies are members of more than 2 supply networks often with stable structure and good economic positions. That is one of the reasons for such significant monitoring of logistic indicators focused on up and down stream cooperation. Companies belonging to the cluster 2 are mainly focused on downstream cooperation. The Cluster 2 includes mostly SMEs, these companies have only week bargain power to their suppliers, and on the other hand these companies are very sensitive to delivery price. They are oriented on quality of deliveries, customers and good relationships with suppliers. Companies in cluster 3 are focused on reporting by indicators and tend to be perfect in monitoring. There are two main groups of companies: First of them concentrates big companies with sophisticated evaluation systems of process and performance indicators. Second group of companies are new firms, which try to create new information system for performance or process evaluation. This cluster has big potential to sharing information in supply chain on condition that method of calculation sustains identical. Companies in cluster 4 consider indicators as not so important and monitor only a few indicators which are connected with accounting.

Based on the classification stated above, mainly the companies with parallel characteristics like a Cluster 3 members should be interesting for the future research. Other important question for next step of survey is to find if the membership in Cluster 3 (the group of new companies) will be changed in time (when companies reach the other stadium of their development) and they will be joined for example to the cluster 1 or 2. Further, we would like to focus on demon-

stration of the dependence between logistic indicators monitoring, information sharing and financial performance of the companies.

At this stage of the research process it is hard to express any specific political or economic implications. We can only estimate that strong impact on C2C cooperation will lead to creation of strength relationships and more linkages through the whole economy. The competitive companies will bring new waves of information sharing and needs in IT sector for example intelligent solutions for whole Supply chain or network.

Although is information initially shared, it must to be determined by recipient whether it provide visibility. It is more informed decision making that potentially leads to improved performance (Barratt and Oke 2007). In the agile framework we propose that up to four different demand/supply chain configurations will possibly exist in any given situation, with some clearly more dominant than others (Gattorna 2003). Collaborative supply chain is one of the four configurations.

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Impact of Cash Conversion Cycle on Sales of Enterprises Manufacturing Machinery and Equipment in the Czech Republic

Zdeněk Motlíček, Pavlína Pinková, Dana Martinovičová[1]

Abstract*: The way of working capital management may have a significant impact on companies' performance and their strategic plan. This is caused by an unambiguous effect of the size of working capital both on companies' costs and companies' sales. The impact on strategic planning emerges from the fact that setting up the structure of working capital determines the required size of storage and production capacities. However, working capital management options are determined by the impact of individual interest groups. With respect to a relationship between working capital and sales, the customers are a decisive interest group. This fact stems from the pressure of customers on time availability of required products and on payment terms that are associated with product delivery. The failure to comply the requirements may lead to fluctuation of customers and subsequently to fluctuation of sales.*

The paper presents an empirical research on the extent of influence of the fulfilling customers 'needs on the size of sales. These variables have been quantified using the inventory turnover, which represents the availability of particular products for customers, and the average collection period, which represents the payment terms via provided maturity of receivables. The results presented in the paper quantify the degree of these impacts and thereby enable to the managers to quantify the impacts of individual optimization decisions on the size of sales in the following period. It allows the businesses to set such a level of working capital that maximizes the company's performances.

Key words: Working Capital · Sales · Aggressive Management Policy · Conservative Management Policy · Inventory Turnover · Average Collection Period

JEL Classification: G32

1 Introduction

Working capital management is an integral part of financial management because it ultimately affects asset and capital structure, as well as business risk. Consequently, working capital management significantly influences corporate performance not only from the perspective of operational area, but also from the viewpoint of strategic area, since the planning of working capital affects strategic decision-making in the field of new investments. Working capital is comprised of inventories, receivables and financial assets (Kislingerová, 2010). Hence, working capital management relates to management of all these components (Pavelková & Knápková, 2009).

Tomek (2007) believes that the impact of working capital components on sales may be significant; particularly, time delivery of finished products, but also average age of accounts receivable, considerably affects the customer's perception of delivered performance. According to Pavelková & Knápková (2009), it is primarily asset turnover that causes the impact of working capital management on corporate performance. This has been also confirmed by Kislingerová and Hnilica (2008). Režňáková (2010) states that aggressive working management policy increases corporate performance from the perspective of the owner through the shortening of cash conversion cycle. However, it can be assumed that these consequences may differ for different industries. According to Filbeck & Kruger (2005), these differences between industries should remain constant in time. Bellouma (2011) considers the shortening of cash conversion cycle as an opportunity for release of liquidity, which can subsequently serve as the source for financing of capital investments. The effect of such investments is then the reduced working capital need. In contrast, Banos-Caballero, García-Teruel & Martínez-Solano (2014) search for working capital optimum level. The authors suppose a concave link between working capital level and corporate performance; the curve optimum is determined using the derivative of the relationship. Nazir & Afza (2009a) has confirmed a rising part of the concave curve that has been described by previously mentioned authors. According to their research, a moderate asset management policy (i.e. a higher proportion of current assets to total assets) results into higher profitability. Similar findings have been reported by Tufail (2013).

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Motlíček & Martinovičová (2014) have observed a strong positive correlation between size of sales and size of components of net working capital in a given year. However, the authors conclude that it would be probably more appropriate to consider time delays of individual effects for the measurement of the relationship.

Hill, Kelly & Higfield (2010) and Nazir & Afza (2009b) have noted a positive correlation between the working capital expenditures and the size of free cash flow. Hence, it can be assumed that businesses tend to invest money in working capital rather than in securities or other investment activities. Particular authors also mention the access of businesses to financial resources as an important factor, which is subsequently related to the size of cash balances held and the size of investments in working capital. According to Bigelli & Sánchez-Vidal (2012) these factors are mainly influenced by the firm's size and firm's marketability on the stock exchange. These conclusions have been supported by Al-Najjar (2013). Subramaniam, Tang, Yue & Zhou (2011) complement the findings by comprising the degree of production diversification and Aydin Ozkan with Neslihan Ozkan (2004) by comprising the influence of separation of ownership and management structures.

Based on the above mentioned findings, it is obvious that the manner of working capital optimization is a large issue that covers several research directions and questions. Hence, the authors of the paper focus their research on a comprehensive examination of the impact of working capital management on corporate performance. The presented results extend the previous study *"Impact of working capital management on sales of enterprises focusing on the manufacture of machinery and equipment in the Czech Republic"* published in the scientific journal Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis (see Motlíček & Martinovičová, 2014).

The objective of the present paper is to describe and quantify the degree of impact of inventory turnover and average collection period on the size of sales in the following period for the medium-sized enterprises located in the Czech Republic and manufacturing machinery and other equipment.

2 Methods

For the examination of the impact of working capital on sales, the data of only one industrial branch and only one size have been chosen. This technique is indispensable because the level of working capital held may significantly vary across the industries. Moreover, this level may significantly vary within one industry since firm's size strongly affects the access to financing resources.

Data have been gathered from the Amadeus database and cover years 2011 and 2012. The study is aimed to medium-sized companies located in the Czech Republic. All the companies are focused on the manufacture of machinery and equipment, according to CZ-NACE classification they belong to section 28. The companies with incomplete entries for years 2011 and 2012 have been excluded from the sample. The final sample consists of 24 companies that have satisfied all criteria mentioned above.

In the context of empirical research, the relationship between sales of year 2012 and inventory turnover and average collection period of year 2011 has been investigated. It has been also assumed that the size of sales has a determining influence on the size of fixed assets. Firstly, data have been analysed using XY diagrams that have indicated a linear dependence. Next, the correlation analysis has been applied to verify if there exists a dependence relation between selected variables. Then, the data have been examined using regression analysis to determine the impact of above specified variables on the level of sales. The values of final accounts on balance sheets and profit and loss statements have been used to determine the size of sales and fixed assets for year 2012 and to calculate the inventory turnover and the average collection period for year 2011. Obtained regression models have been subjected to economic verification. Based on this verification, the model has been confirmed or adjusted. The following sections of the paper discuss only the verified models that belong to so-called BUE or BLUE estimators. Regression model and correlation matrix have been created in statistical software Gretl.

The following regression model has been used to investigate the data:

Model A $$S = \beta_0 + \beta_1 \text{INV\_turnover} + \beta_2 \text{REC\_turnover} + \beta_3 \text{FA} + \varepsilon \quad (1)$$

where,

S are sales of year 2012
INV_turnover is inventory turnover in year 2011
REC_turnover is average collection period in year 2011
FA is size of fixed assets in year 2012
ε is the random error

Equation A $$INV_{turnover} = \frac{INV}{OC} * 360 \quad (2)$$

Equation B $$REC_{turnover} = \frac{REC}{S} * 360 \quad (3)$$

where,

INV is size of inventories
OC are operating costs
REC is size of receivables

3 Research results

Considering the findings of aforementioned researchers, it can be concluded that there exists a strong dependence between corporate performance and approach to working capital management. Previous results of the authors of the study have confirmed a significant impact of receivables and inventories on the size of sales (Motlíček, Martinovičová, 2014). The present research is specifically concerned with the impact of inventory turnover and average collection period on future size of sales. Using the transformation of the size of inventories and receivables into the days of their turnover, undesirable effects on the interpretation of regression model results have been eliminated.

Firstly, the data have been subjected to a correlation analysis. Obtained results are summarized in table 1. Correlation coefficients are significant at 5% significance level. In spite of the fact that values of correlation coefficients do not reveal a strong relationship, it is obvious that selected explanatory variables have a significant impact on the size of sales. The highest correlation coefficient can be observed in the case of inventory turnover variable, followed by average collection period variable. The correlation matrix further shows that there is no significant correlation between individual explanatory variables. Nevertheless, the results of correlation analysis do not allow quantify the degree of influence of particular independent variables on the dependent variable.

Table 1 Correlation matrix

Sales th CZK 2012	Fixed_assets_2012	receivables_turnover__2011	inventory_turnover_2011	
1.0000	0.2569	0.4938	0.5691	Sales_th_CZK_2012
	1.0000	0.1834	-0.0081	Fixed_assets_2012
		1.0000	0.3368	receivables_turnover__2011
			1.0000	inventory_turnover_2011

Source: Authors' calculations

Further, the data have been analysed using regression analysis. The initial model has indicated verification problems relating to heteroskedasticity. Because of the non-fulfilment of the classical linear assumption, some of the other results of verification tests have been negative. However, if the model is tested at 10% significance level, the violation of the assumption would not be so serious. Consequently, this deficiency is solved by the model with corrected heteroskedasticity. The final model is illustrated in table 2.

Table 2 Regression model A

	Coefficient	**Std. Error**	**t-ratio**	**p-value**	
Const	15113.2	7756.88	1.9484	0.06554	*
inventory_turnover_2011	582.734	169.654	3.4348	0.00262	***
receivables_turnover__2011	727.206	240.194	3.0276	0.00665	***
Fixed_assets_2012__int_tan_	0.739488	0.212557	3.4790	0.00237	***

R-squared	0.686694	Adjusted R-squared	0.639698
F(3, 20)	14.61178	P-value(F)	0.000029
Log-likelihood	-42.51462	Akaikecriterion	93.02924
Schwarz criterion	97.74146	Hannan-Quinn	94.27939
Meandependent var	69628.54	Standard deviationofdependentvariable	52276.98
Sum squaredresid	3.45e+10	Standard. errorofregression	41541.79

Source: Authors' calculations

Model is statistically significant at 5% significance level and it describes 68,7% variability of the sample. Also, all explanatory variables are statistically significant with the exception of the constant term, which is significant at 10% significance level. Since the error term is normally distributed, the model belong to so-called BUE estimators (i.e. best unbiased estimator).

The constant term of the regression model indicates that 15 113 200 CZK of sales are determined by variables not involved in the model. This value represents 21,705% of the average size of sales in the selected industry. The coefficient of the variable of fixed assets shows that an increase in fixed assets by 1 CZK leads to an increase in sales by 0,74 CZK. It may be explained by an increase in production capacities, which subsequently enables an increase in production and in sale. This sales growth, though, will be under-proportional, but it is still very important. It can be assumed that it will take more than one period.

Nevertheless, the objective of the paper is to explain and describe the impact of inventories and receivables on the size of sales. The results of model A indicate that if there is an in increase in inventory turnover by one day, it will lead in the following year to an increase in sales by 582 700 CZK on average. In relative terms, this means a growth in sales by 0,837%. The authors believe that this growth may be caused by a better availability of finished products for customers. A longer cash conversion cycle can be arisen as a result of a higher level of stocks of finished products. Further, the results suggest that if there is an increase in average collection period by one day, it will lead in the following year to an increase in sales on average by 727 200 CZK. In relative terms, this expresses a growth in sales by 1,044%. In the opinion of the authors of present study, this effect may be caused by a longer maturity of receivables, which will be reflected in average collection period.

4 Conclusions

The objective of the present paper is to describe and quantify the relationship between company's sales and inventory turnover and between company's sales and average collection period in the case of medium-sized companies based in the Czech Republic. The research has included only the companies belonging to section 28 according to CZ- NACE classification, the manufacture of machinery and equipment. Based on the selected criteria (i.e. industry, size and completeness of the data), the sample consists of 24 companies. The data obtained from the Amadeus database have been analysed using a correlation matrix and a multivariate regression model.

The results of the regression model suggest that an extension of inventory turnover and an extension of average collection period have a positive impact on the size of sales in the following period. More specifically, the extension of inventory turnover by one day results in the following period into a growth of sales on average by 0,873%, the extension of average collection period by one day results into a growth in sales on average by 1,044% in the following period.

The findings of the research presented in this paper have confirmed the conclusions of its authors published in the past concerning that there exists a significant positive correlation between sales and working capital management in the company. This finding complements the existing literature and other previous evidence. The authors also believe that presented conclusions are important for the application of knowledge of financial management in practice. The current state of knowledge on financial management tends to recommend a shortening of cash conversion cycle. However, this does not always correspond to real behaviour of business entities. The results of the paper may help the managers in the optimization decision-making process since these results enable to quantify the impact of optimization decisions on the average size of sales.

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For a Discussion of the Economic Recession: Does the Tax Revenue from Excise Taxes Change During Economic Recession?

Jarmila Rybová[1]

Abstract*: The article is focused on the revenue from excises taxes in the Czech Republic and the countries immediately bordering with the Czech Republic. Excise taxes are examined through economic indicators, the share of excises taxes to GDP, the share of excises duties and taxes on the total of tax revenues and revenues from excises taxes in millions of euros. These economic indicators are compared to the indicator of GDP at current prices, expressed in purchasing power standards (PPS) and the compound tax quota. The data source of economic indicators is Eurostat. The European System of Accounts ESA 95 forms the methodological framework. The article contains annual data observed for the period 2000 to 2012.*

The aim of this paper is to determine changes in tax revenue from excises taxes in periods of slowing economic growth and how these changes are reflected in the consumption expenditure of households. On the basis of these data it is estimated whether excise duties and taxes fulfil economic generally attributed functions in selected countries. It is not only about the fiscal, allocation and redistribution functions, but also whether these taxes stimulate consumers to engage in particular behaviour in the conditions of economic recession. The results show that excise taxes can be used as controlled or automatic stabilisers in public budgets with other economic instruments. Their incidence can be described as gentle and desirable in years the 2008 to 2009.

Key words: Excise Taxes · Tax Revenues · Taxation Quote · Consumer · Gross Domestic Product

JEL Classification: H21 · H31 · M48

1 Introduction

The decline in economic growth, which has occurred recently both in the EU and elsewhere, could change consumers' behaviour. The rising unemployment, inflation and the decline in real disposable income may lead consumers to buy less and save more, probably out of fear of the future development of the economic environment. Subsequently, these facts may have an impact on tax revenue.

Tax theory recommends to government access to the modification specific excise taxes differently than in the case VAT or other taxes “ad valorem” at GDP growth or decline.

Excise taxes are putting a strain on consumption of selected products. As a result, consumers may give a priority to the substitution by consumption of other products, services, or savings. The reason is high taxation of consumption of these selected products.

Although products taxed by excise taxes have low elasticity of demand, lower household spending may also have an effect in relation to the lower public budget revenues from excise taxes. Is likely, given the elasticity of demand for these products, that consumers will continue to buy products subject to excise taxes. They can buy smaller amounts or give preference to cheaper products over expensive ones. For example, the share of excise tax on the final consumer’s price cigarettes is usually higher in the cheaper cigarettes brands than in the more expensive brands.

Burdening of selected production by excise taxes is impacting not only consumers of the taxed products, but also indirectly, through the tax incidence effect, other consumers and employees, who do not purchase taxed products. Taxation generally affects the behaviour of economic subjects in the market of production factors, capital and in the market of goods and services. It may influence, for example, changes in consumer preferences in relation to savings, work or leisure time. For example, the media in the Czech Republic in February 2013 discussed the issue of the increase in excise duty on mineral oils, particularly oil, which is used for agricultural purposes, known as bio diesel. It is expected, that the impact of an increase in the rate of excise duty on mineral oils will primarily affect employees of farms.

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2 Literature review

Excise taxes are included in prices of selected products, and they are imposed "on an item ". They are called "in rem". They do not reflect the taxpayer's ability to pay. Sorting of taxes is described in greater detail by, for example, Kubátová & Vítek (1997) and Svátková (1994). Svátková (1994) sorts the excise taxes as an object taxes, because they do not respect the taxpayer's personal situation, and she states that this classification is important for the degree of fairness of the tax system.

Cnossen (2012) says: “Excise duties are selective and discriminatory in intent. Excise tax liabilities are often measured quantitatively and enforcement may be subject to physical controls. Goal of excise duties is to improve allocation of resources. ”

“The economic theory prescribes that, if goods are unrelated in consumption, tax rates should be higher on the good with the lowest elasticity. This finding is known as the Ramsey rule (1927). It holds that, subject to certain conditions about the range of other tax instruments available to the authorities, the rate of tax on the sale of each good should be set inversely proportional to its elasticity of demand (holding the elasticity of supply constant).” (Cnossen, 2005)[2]

Corlett & Hague (1953) have proved that, because leisure cannot be taxed, efficient taxation requires taxing products that are consumed jointly with leisure at a relatively high rate. The taxing complements to leisure improves resource allocation. Detail in a Cnossen (2005).[3]

The Auerbach (2006) study "The choice between income and consumption taxes: A Primer" states some benefits from consumption taxes, which are not given deserved attention. For example, the ability of consumption taxes more sharply to affect the balance of payments across national borders than income tax.

Kubátová & Vítek (1997) states that in terms of inflation, selective excise taxes (imposed as a unit) are not considered dangerous. If nominal prices are growing, they stay nominally constant. They therefore cause an anti-inflationary effect unlike taxes “ad valorem”, which grow with inflation.

Some of these excise taxes are specific to a certain extent also due to the fact that taxes affect the products, which may cause undesirable addiction of the organism of a particular consumer. An addition to taxed alcohol or tobacco products can cause more or less different behaviour among consumers. A drug addiction can reduce the elasticity of the demand curves for the taxed products and consumer sensitivity to taxation. The issue of addiction may have a role in taxation, both in terms of the consumption of harmful products and in terms of tax revenue.

The results of the study by Fletcher et al. (2009) suggest that the dependence of the individual reduces its sensitivity to changes in cigarette prices and to taxation. To reduce youth smoking, the authors recommend adding another tax policy. Thus, research has indicated that the price elasticity of demand for cigarettes and alcoholic beverages among the young is, on average, twice the price elasticity among adults.

The application of excise duties can from a macroeconomic viewpoint helps to reduce fluctuations in the economic cycle. Excise taxes may be applied as automatic or managed stabilisers by fiscal policy. Suitable applications and flexible adaptation of taxation can contribute to positive economic growth. Kubátová (1997) states: "The stabilisation function of taxes generally depends on two factors: the elasticity of taxes with respect to its tax base and the tax base elasticity of gross domestic product." Excise taxes directly affect aggregate demand. It is a reason to apply excise taxes as possible application as a suitable stabiliser of fiscal policy. They can be classified also as relatively significant taxes. Kubátová (1997) specifically in relation to the excise taxes adds: "Differential taxation, which includes higher rates for goods and services, the consumption of which fluctuates depending on the phase of the economic cycle, such as luxury goods, has more of an effect than the proportional effect of excise taxes and VAT."

Stiglitz (1997) addresses the current and future consumption in relation to taxation: "Deciding between present and future consumption is practically no different from deciding to buy two different commodities." In relation to the future consumption with regard to excise duty, it may be noted that future consumption can be affected by legislative changes with an emphasis on changes in tax rates and economic expectations of consumers.

Svátková et al. (2007) mentions the issue of frontloading retailers before raising excise taxes. As a result of this circumstance, observed fluctuations can be observed in the consumption of goods taxed by excise taxes in the period before the increase in the excise tax rate and consequently lower tax revenues from excise taxes.

[2] Cnossen (2005) [cit. 13. 2. 2015], s. 597
[3] Cnossen (2005), s. 597

The list of studies is not exhaustive. Results of these studies are dependent on the quality of applied data, selected examination methods, period and interpret the results.

3 Methodology

The Eurostat databases are the source of all of the economic indicators. The examined period is limited from 2000 to 2013. Some statistical data are available only until year 2012. When examining data, it needs to be taken into consideration that the methodology of individual states in performing the calculations of the specified indicators is not entirely the same.

The economic growth is expressed by indicator of GDP in market prices per capita in purchasing power standards (PPS per person). Through the development of this indicator in 2000-2012 in the Czech Republic and its immediate neighbouring states, the periods of economic growth and economic recession are determined.

Subsequently, the economic indicators are measured related to income tax in selected states with respect to the excise tax. It is a compound tax quote, the share of excise taxes on GDP and the share of consumption taxes in total taxation. The tax classification corresponds with the European System of Accounts ESA 95, and the sources of all data are statistics from Eurostat.

These economic indicators are compared with household spending. It is necessary to know if the development of economic indicators corresponds to private household consumption expenses according to the COICOP methodology on products after excise taxes. Then, it needs to be found out which factors may influence the development all of these indicators. In order to determine data regarding tax revenues from excise taxes, within the classification ESA 95, items d2122c and d214a, containing excise tax (without VAT and import tax) are added up.

The household consumption expenditures on products affected by excise taxes are determined by figuring the sum of the selected items of annual consumption expenditure in selected countries, according to the COICOP classification. There are consumer household expenditures on alcoholic beverages, tobacco and consumer spending on transportation. These consumer expenses per capita are expected to include excise taxes affecting alcoholic beverages, tobacco and mineral oils (fuels and lubricants). Fluctuation of the selected consumer spending may be due to changes in the quantity of consumed goods or services or changes in consumer prices of the taxed products. Stocks of households and shopkeepers are not taken into account.

The aim of this paper is to determine the period of slowing economic growth and economic recession, changes in tax revenues from excise taxes in this period and whether Changes in economic indicators including tax revenues from excise taxes are also reflected in households' consumption expenses. Factors that could affect such changes are presented in relation to the specified aim.

4 Results

The economic growth slowed down in the period 2007-2008 in these selected countries. The indicator GDP at current market prices per inhabitant (in PPS) decreased in the selected countries, including the average of the EU-28 during 2008-2009. This period 2008-2009 could be called “an economic recession”, based on the applied GDP indicator. In the Czech Republic, this period was longer, from 2007 to 2009. In subsequent years, the GDP increased year on year. Poland is only country where a slightly increasing trend of the GDP per capita indicator (PPS) continued without interruption even during a recession.

The excise tax revenue in millions of euros mainly maintained a gradual upward trend in the period from 2000 to 2012 in all monitored countries. In a period of economic recession, we meet with declining tax revenues from excise taxes in most studied countries. The tax revenue from excise taxes declined in the selected countries in 2006, 2008, 2009 and 2012. The fall in excise taxes revenue may have been caused by a decline in household consumption expenditure on products burdened by excise taxes, reducing the production of taxed goods or restrictions on imports.

Figure 1 GDP at market prices per capita in purchasing power standards (PPS) in the period 2000-2013 in selected countries of the European Union

Source: Eurostat database

The development of the share of excise taxes in GDP (%) in the period between 2007 and 2009 did not change very dramatically. The share of excise taxes in GDP fluctuated or slightly fluctuated. If the GDP indicator declines, we can accurately state that reducing percentages of excise taxes on GDP are the reason for declining excise tax revenues. On the contrary, increasing the values of the indicator may indicate that the revenue from excise taxes does not drop or falls more slowly than gross domestic product.

The share of excise taxes in the total taxation revenue in period up to 2004 mainly grew. During the next period, 2004-2008, the share of excise taxes in total taxation mainly decreased in the studied countries. The reason for the decline of this ratio indicator during a recession can be a reduction in tax revenue from excise taxes or an increase in total tax revenue in certain years due to growth in revenue of the other taxes. The share of excise taxes in total taxation revenue started increasing gradually again up to 2008. In a period of economic recession, we can expect decreasing tax revenue from most taxes.

Declining tax revenues are reflected in the indicators of the tax quote. The compound tax quote, including total revenues from taxes and social contributions in relation to GDP, mainly grew in the Czech Republic from 2000 to accession to the European Union in 2004. In the next years, 2005-2006, the values gradually decreased. In the year 2007, the compound tax quote of the Czech Republic returned to the level from year 2004, 35.9%. During the economic recession of 2008-2009, the compound tax quote in the Czech Republic declined. The lowest compound tax quote in the Czech Republic was in the year 2009, at 33.4%. It is the lowest compound tax quote within the specified period 2000-2012, and it is less than the tax quote in 2000. This indicator of the compound tax quota slightly increased in the last three years (2010-2012). The highest compound tax quota in the Czech Republic was in 2004 and 2007, in both cases 35.9%.

The trend of the development of the compound tax quote in the other member states directly bordering on the Czech Republic, in 2000-2004, was opposite to the Czech Republic, as it decreased. The compound tax quote in these states (except Austria) was lower in 2004 than its level in 2000. In 2005 the described indicator declined in the Czech Republic, Austria and Slovakia. The compound tax quote in the studied countries in the years 2006-2007 generally slightly increased.

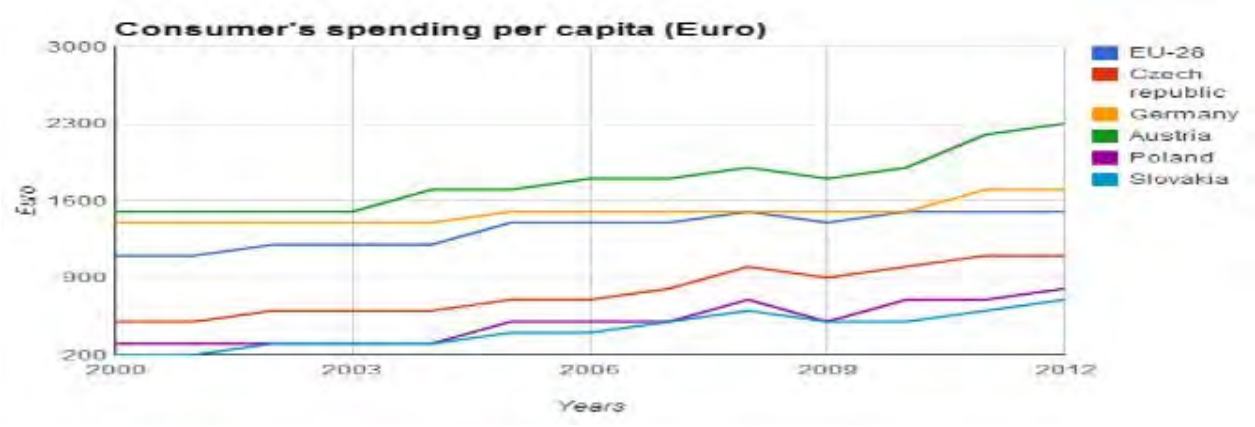
During and after the recession, 2008-2010, the compound tax quote decreased in a majority of selected states. The average values of this indicator in the EU-28 also decreased. Since 2010, the compound tax quote of individual states and the average value of the EU-28 has again taken a gradual upward trend.

These macroeconomic indicators are in comparison with the household spending, which are based on COICOP classification. Items of consumer expenditure per person include expenditure not burdened by excise taxes, such as expenditure for alcoholic beverages and transportation.

These selected economic indicators confirm that revenue from excise taxes during an economic recession decreases. It is probably influenced by the decline in household consumption expenditure on products burdened by excise duties, such as alcoholic beverages, tobacco and mineral oils. The consumer behaviour during an economic recession is influ-

enced by a lot of factors that cannot be elaborated on in this article. The decline in consumption expenditure per capita may be due to development of these consumer prices. The HICP indicator for alcoholic beverages and tobacco in the 2008-2009 grew in the surveyed countries (except Germany) faster than in other years. In the case of transport, the HICP declined usually, probably due to decreasing demand in this sector in year 2008. In subsequent years, the HICP for transport slowly increased. It is probably supported by implementation of the cash for clunkers programme in some countries. This situation from 2008 to 2009 repeated in 2012-2013, and the indicator HICP decreased again in all studied countries. The average of the EU-28 for the HICP for transport grew in 2013 about 0.4% in comparison with the previous year.

Figure 2 Consumer spending on alcoholic beverages, tobacco, narcotics and shipping costs (according to the COICOP)



Source: Eurostat database

Cnossen (2005)[4] says: "The structures of the domestic industry and the preferences of consumers were framed by choices ad valorem-based structures and others for specific systems. In markets with predominantly ad valorem structures, consumers became used to low-cost and low-quality European tobaccos, while smokers whose habits had been formed under specific taxation preferred longer cigarettes manufactured from American tobacco. Local industries developed to meet those preferences. That is why, once trade liberalization and tax harmonization became an issue in the European Union, some countries lobbied for ad valorem-based structures and others for specific systems. And yet, it is not apparent that there are substantial benefits from harmonization (and, in particular, from harmonization of structure rather than broad level). In that context, the danger is that harmonization is used, not as a means of achieving a single optimal European tax system, or even as a means of finding a set of common European values, but as a mechanism by which the producers of one state can seek to advance their competitive positions at the expense of others.

5 Conclusions

Clearly, excise taxes have come a long way from the simple efficient revenue-raising measures they once were to the complex policy tools that they have become today.

"Excises on tobacco, alcohol, petrol, and motor vehicles are good potential sources of revenue, because the products are easy to identify, the volume of sales is high, and the fact that there are few producers simplifies collection. Also, there are few substitutes that consumers would find equally satisfactory, so consumption remains high despite excise-induced price increases." (Cnossen, 2005)[5]

It is obvious that consumers in a period of slowing down of economic growth or economic recession temporarily change consumption of products after excise taxes. They are reducing the consumption, and subsequently the revenue from excise taxes to public budgets is reduced too. These observed changes may be caused by the substitution effect, as these consumers can increase the preference of other products and services, leisure or savings. The elasticity of consumer demand for alcoholic beverages and tobacco seems to be lower than elasticity of demand for transport. On the supply side, fluctuations in foreign exchange rates and changes in the structure and volume of production of taxed products can have a certain effect.

[4] Cnossen (2005)[cit. 13. 2. 2015], s. 605
[5] Cnossen (2005) [cit. 13. 2. 2015], s. 597

In 2010, the values of the caused economic indicators began growing again. The gross domestic product began growing too, which could suggest a recovery from the economic recession. On the other hand, it should be noted that the fluctuations recorded on the selected dates are not dynamic enough to pose a threat to the public budgets caused by declining tax revenues. However, this effect of the economic recession on revenues of excise taxes must be reflected in the total tax revenues and on the side public expenditures in public budgets.

Frey argues that tax-price instruments bolster intrinsic motivation consumers. This intrinsic motivation can be enhanced by the author in a positive or negative way. Cnossen (2005)[6] says: "Clearly, the concept of ''intrinsic motivation'' and its relation to external regulatory incentives deserve a place in regulatory theory and practice, particularly because the costs of external incentives, such as excise taxes, weigh most heavily on the poor. Excise taxes should be combined with other policy instruments to achieve desired policy objectives and due attention should be paid to psychological and politicoeconomic considerations."

"Interestingly, the ad valorem excise is mainly an EU phenomenon. It tends to protect the cheap tobaccos grown in southern member states." Cnossen (2005)[7] High level of taxation of consumption taxes in EU can be associated with illegal smuggling of products in Europe reached alarming proportions.

The question is whether the lower level of excise tax rates in the EU would reduce illegal smuggling and attract consumers from countries outside the EU. This could positively affect the results of economic growth in European Union. This study is to some extent subjective, but hopefully it has motivated the reader to study the contributions on the various excise taxes more closely and benefit from their analysis and learn from the perspectives they offer.

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[6] Cnossen (2005) [cit. 13. 2. 2015], s. 605

[7] Cnossen (2005) [cit. 13. 2. 2015], s. 600

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The Aspects of Investments in the Food Industry

Josef Mezera, Roman Němec, Jindřich Špička[1]

Abstract*: The aim of the paper is to compare gross investments into the food industry in the Czech Republic and neighbour states. After the crisis of the euro zone and economy of the European Union and during beginning of economic growth at the macroeconomic level in the Czech Republic has become the hot topic theme - investment activities. The investing relates of various sectors of the national economy, especially the key sectors. These include the food sector in the manufacturing industry. This will be also devoted this paper. This is paper about foreign direct investments, but also about other ways of investment and public funding of the Czech food industry. The analysis showed that there should be massive current investments in the examined sectors. Therefore it is important to investment activity in this sector to support from public funds, and that of the European and national sources. The aim will be the application of modern technologies that will improve the industry in product quality, productivity, efficiency and thus competitiveness, not only of food producers, but the whole food chain.*

Key words: Investments · Food Sector · Support · Technology · Competitiveness

JEL Classification: G32 · L66 · O31

1 Introduction

The At the time when it seems that the EU overcomed the economic crisis and in the Czech Republic began the economic growth, it would be a missed chance to not increase the volume of investments in the national economy, because investments are called one of the engines of the economy. Especially foreign investments bring new technology, knowledge and experience. In comparison with other countries of the Visegrad group includes the total volume of investments in the Czech Republic in relation to gross domestic product (GDP) to the highest and it is above the average of the European Union 27, which occupy approximately 20 % (Kopečný 2013). This does not mean that the situation in terms of another perspective is sufficient. The situation of each sector is significantly different. The key sector should be crucial in investment activities and these include the food sector. The publication Panorama of manufacturing industry of 2012 shows that production of food products and the manufacture of beverages have share in the revenues from sales of products and services in 2012 more than 8 % and the food sector ranks the second position. Already in the period of privatization the foreign investors came into this sector. The two driving factors, market power and profitability can be postulated from the ultimate determinants of foreign direct investment (FDI): growth pressure and profit maximization objective of the foreign food processing firms (Csaba 2001). In addition to obtaining the necessary capital, this input is connected mostly with the development of new technologies and know-how. In the period before joining the EU, it was assumed that FDI will be directed to a unique production (Putičová & Mezera 2004). The foreign companies, which began on "greenfield" or has entered into an existing company has been characterized by higher productivity and competitiveness (Stančík 2007). The arrival of foreign companies, for example, may increase the technological barrier and deter domestic firms that cannot compete in the competition and foreign investors are gradually squeezed out of the market (Ayyagari & Kosová 2008). In the food industry dominated positive effects. Necessary investments are primarily in fixed assets. The problem seems to be the source for the financing of investment, and therefore it seems desirable to use, in addition to private and public sources from the EU and national resources, which are directed at increasing competitiveness. More than 30 % of enterprises in the sector receive public funds, which mostly come from the EU, but also from government sources. Minimum of resources receive innovative enterprises from local and regional resources (Rusňáková & Špička 2013).

The aim of the paper is to compare gross investments into the food industry in the Czech Republic and neighbour states. The paper also provides discussion about future of public funding of the Czech food industry.

2 Methods

The FDI data were analyzed by the Czech National Bank (CNB), which continuously monitors these data. This bank is stated in the structure of CZ-NACE (for the purposes of this paper CZ-NACE 10-12) and are assessed in the annual

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period, in the total volume. The evolution (in this paper is the period 1997-2013) is pictured overall volume and share of these investments in the research sector from the perspective of the national economy. CNB does not provide detailed branch structure, because these data are confidential. The development of investment in fixed assets was also analyzed. It was created interdisciplinary comparison and also international comparison with selected countries. Between selected countries are mainly neighbouring countries of the Czech Republic.

In the field of public financing of the Czech food industry were assessed as support provided by the EU under the Rural Development Programme (RDP).

3 The results of research

3.1 The foreign direct investment in the Czech food industry

The inflow of FDI into the production of food products and the production of beverages including the manufacture of tobacco products (CZ-NACE 10-12) reached (according to preliminary data by the CNB) in the year 2013 the amount of -1 593.5 mil. CZK. Other capital, including received and granted loans, showed a positive value. Negative values were recorded in equity capital and primarily reinvested earnings. In comparison with the year 2012, the situation changed markedly. The total value of FDI (for CZ-NACE 10-12) was significantly higher in 2012 than in 2013.The share of these investments in the total FDI in the Czech Republic was 10.77%.

In contrast, in 2013, this share decreased to a negative value -1.63%. This is result of the fact that significantly reduction the inflow of other capital. The FDI in the reporting production for the period from 1997 to 2013 reached, according to preliminary data of the CNB, the amount 85 626.1 mil. CZK. The share of investments in total investments of the national economy was 3.17%.

Table 1 FDI in food production, beverages and tobacco products (mil. CZK)

Name	**2012**	**2013**[4)]
Equity capital[1)]	2 043.5	-611.1
Reinvested earnings[2)]	-3 313.0	-1 704.9
Other capital[3)]	18 102.0	722.5
Total	16 832.5	-1 593.5

1) Equity capital comprises nonresident investment in the ekvity of a company
2) Reinvested earnings consist of the direct investors share (in proportion to direct ekvity participation) of earnings not distributed as dividens
3) Other capital covers the borroving and lending of funds, including debt securities and trade credits, between direct investors and their affilated enterprises and fellow companies in the same enterprise group. These transations are recorded under itnercompany claims and liabilities
4) Preliminary data

Source: ČNB

The outflow of investments from the Czech Republic to abroad (in the CZ-NACE 10-12) for the year 2013 reached, according to preliminary data CNB, 565.9 mil. CZK. For the entire period (1997 - 2013) reached the outflow of these investments 1 557.7 mil. CZK. It represents the share 0.39% in the national economy. For the Czech Republic is crucial inflow of FDI , which should be directed to capital-intensive and perspective industry. For example, in the production of semi-finished and finished foods, after which there is a demand.

3.2 The investments in fixed assets in the food industry with the international comparison

The analysis is focused on the development, structure and international comparison of investments especially in the manufacture of food products and the production of beverages in the period from 2008 to 2012.

3.2.1 The analysis of investments in fixed assets in the manufacture of food products

Between the years 2011 and 2012 reached the maximum growth of investments in fixed assets in the manufacture of food products Austria, where these investments increased by 13.12%. In the Czech Republic this indicator between the years 2011 and 2012 increased by 0.05%. In these years the largest reduction in the volume of this indicator occurred in Slovakia (-23.15%). The Slovak Republic has a downward trend in this indicator since 2009.

In comparison with 2008 this indicator increased in 2012 in Germany by 14.19%, in Hungary by 25.45% and in Austria by 14.18%. In the Czech Republic this indicator slightly decreased (see table 1). In the Slovak Republic it significantly decreased by 40.38%.

The development of this indicator in the Czech Republic shows the lack of financial resources for investments in fixed assets in the food industry. The solution of this situation will help to the measure of the Rural Development Programme 2014 + focused on investments in fixed assets.

Table 2 Gross investment in tangible goods in the manufacture of food products (EUR million)

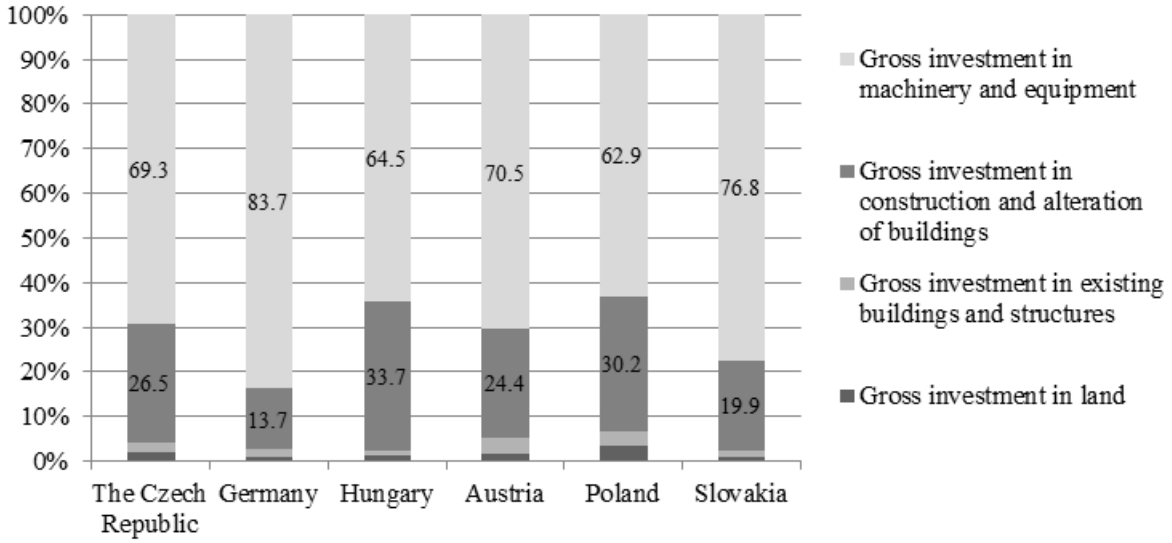
state	2008	2009	2010	2011	2012	Index (2012/2011)	Index (2012/2008
The Czech republic	379.40	331.30	335.50	377.80	378.00	100.05	99.63
Germany	3 657.00	3 773.60	3 766.30	3 941.70	4 176.00	105.94	114.19
Hungary	280.60	276.00	298.10	350.10	352.00	100.54	125.45
Austria	492.30	462.70	460.50	496.90	562.10	113.12	114.18
Poland	1919.70	1 271.90	1 496.20	1 630.10	1 642.10	100.74	85.54
Slovakia	210.50	219.30	174.40	163.30	125.50	76.85	59.62

Source: Eurostat

Investments in machinery and equipment represent nearly three quarters of the total investment (74%), investments in construction and alteration of buildings represent 22%, investments in land and investments in existing buildings and structures represent 4%.

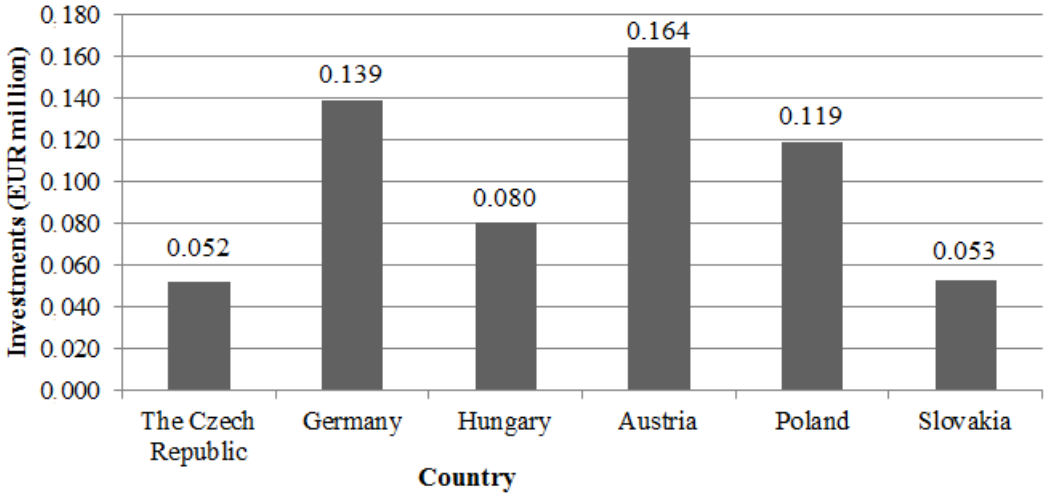
Comparison of the structure of this indicator in 2011 with neighbouring countries is shown in figure 1. The largest deviations in the structure was achieved by the indicator "gross investment in machinery and equipment." In the Czech Republic this indicator has share 69.3% of the total investment and in Germany 83.7%.

Figure 1 Comparison of the structure of gross investments in the manufacture of food products in 2011



Source: Eurostat

Figure 2 Comparison of investments in tangible goods per one company in 2012 in the manufacture of food products (EUR million)



Source: Eurostat

Comparison of average investments in fixed assets per one company in 2012 in the manufacture of food products with neighbouring countries is shown in the figure 2. The Czech Republic reaches the lowest values of this indicator (0.052 EUR million). This value represents only 31.7% of the value of this indicator for Austria. The international comparison shows the lack of financial resources for investments in the czech food industry. In the Czech Republic in the manufacture of food products are the smallest investments per one company. This indicator also depends on the degree of concentration of the monitored production.

3.2.2. The analysis of investments in fixed assets in the manufacture of beverages

Between the years 2009 and 2010 decreased investments in fixed assets as a result of the economic crisis. In 2011, the economic recovery is reflected in the growth of this indicator in all neighbouring countries, with the exception of Slovakia. In 2012, this growth continued and reached the maximum value in Austria (annual growth 49.53%). In the Czech Republic this indicator in 2012 increased by 3.28% and the smallest growth this year was achieved in Germany (see table 3). Investments in fixed assets in the manufacture of beverages in 2012 exceeded the value of 2008 only in Austria and Hungary. Comparison of the index change of the indicator in 2012 in the Czech Republic shows greater growth in the manufacture of beverages than in the production of food products.

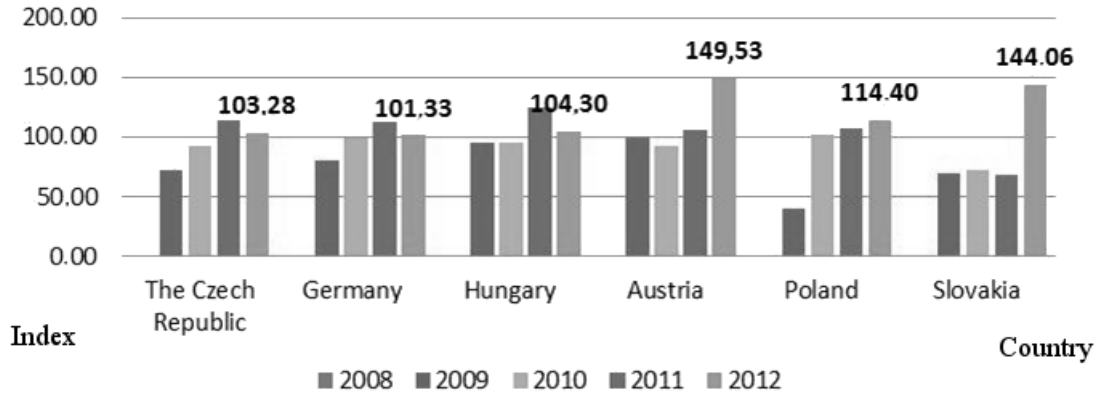
Table 3 Gross investment in tangible goods in the manufacture of beverages (EUR million)

state	2008	2009	2010	2011	2012	Index (2012/2011)	Index (2012/2008
The Czech republic	231.8	166.60	154.10	176.70	182.50	103.28	78.73
Germany	1146.50	927.00	919.40	1037.00	1050.80	101.33	91.65
Hungary	88.10	83.80	80.10	99.90	104.20	104.30	118.27
Austria	152.40	151.30	140.50	149.20	223.10	149.53	146.39
Poland	500.80	199.00	202.00	217.40	248.70	114.40	49.66
Slovakia	81.40	57.10	41.60	28.60	41.20	144.06	5.61

Source: Eurostat

In the following figure 3 is shown the development of the annual index of this indicator in the neighbouring countries and Hungary.

Figure 3 Index of indicator of gross investments in tangible goods in the manufacture of beverages



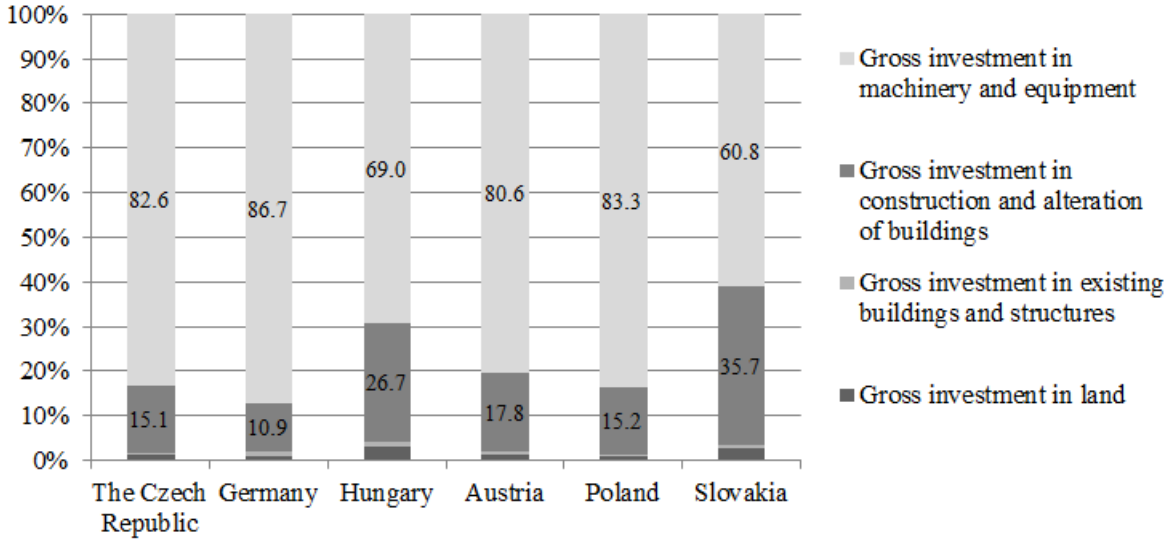
Source: Eurostat

Investments in machinery and equipment represent 81.6% of total investments, investments in construction and alteration of buildings 17.2%, investments in land 1.0% and investments in existing buildings 0.2%.

In the manufacture of beverages is higher share of investments in machinery and equipment than in the production of food products.

Structure of investments in the international comparison is shows in figure 4. In 2011, the structure of investments in fixed assets differs in Hungary and Slovakia, where was higher proportion of investments in construction and alteration of buildings.

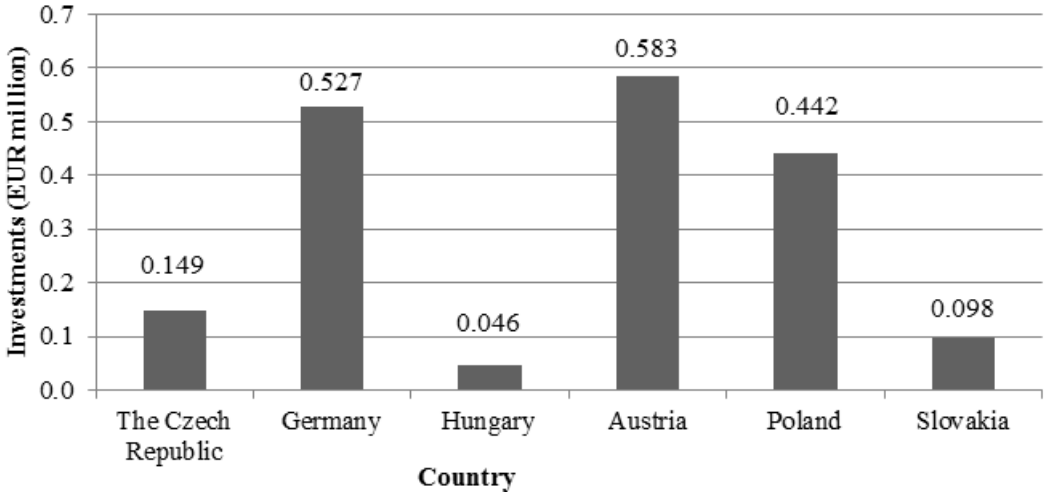
Figure 4 Comparison of the structure of gross investments in tangible goods in the manufacture of beverages in 2011



Source: Eurostat

Investments in fixed assets per one company in 2012 in the manufacture of beverages is shown in figure 5. The Czech Republic in this indicator reaches higher values than Slovakia and Hungary, but only 25.55% of the maximum value for Austria. The amount of this indicator and its position in the international comparison shows a lack of financial resources for investments.

Figure 5 Comparison of investments in tangible goods per one company in 2012 in the manufacture of beverages (EUR million)



Source: Eurostat

3.2.3 Summary

In the manufacture of food products in the Czech Republic in the years 2011 and 2012 is reflected the economic recovery by small growth of investments in fixed assets. But the value of this indicator in the Czech Republic did not get to its level as in 2008. In the years 2011 and 2012 grow this indicator in all neighbouring countries, with the exception of Slovakia. Indicator average volume of investment in fixed assets per one company for the czech production of food products in comparison with neighbouring countries reached the lowest values.

In the manufacture of beverages in the Czech Republic, the economic recovery also begins to show the growth of investments in fixed assets in the years 2011 and 2012. Change in the values of this indicator in the 2012 shows greater growth in the manufacture of beverages than in the production of food products. Another difference against the production of food products is a higher share of investments in machinery and equipment. The indicator "Investments in fixed assets per one company" in 2012 in the czech manufacture of beverages reached higher values than in Slovakia and in Hungary, but only a quarter of the maximum value for Austria.

The development, structure and international comparisons of investments in fixed assets show a lack of financial resources for investment in the czech food industry.

3.3 Discussion about the future of public funding of the Czech food industry

In the Czech Republic, companies as well as family firms can use various public sources for co-funding of investments. The public funding competence is divided between the Ministry of Industry and Trade and the Ministry of Agriculture. The Ministry of Industry and Trade supports long supply chain food processors like bakeries. Ministry of Agriculture (MoA) provides national and European support of investments in short supply chains, like milk processing, meat processing or processing of fruit and vegetables. In the past programming period 2007 – 2013, Ministry of Agriculture supported adding value to agricultural and food products (measure I.1.3). The measure responds to the strategic objective to improve the competitiveness of agri-food industry by focusing especially on the improvement of the performance of processing enterprises and on the development of new outlets for agricultural products, support for marketing of agricultural products, and the development of innovations within the agri-food production, namely through cooperation with persons taking part in research and development. In the new programming period (2014 – 2020), the support of investments in food processing will be available in two measures – No. 4 (Investments in physical assets) and No. 16 (Co-operation). According to the Regulation (EU) No. 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005, support within the measure No. 4 shall cover tangible and/or intangible investments which concern the processing, marketing and/or development of agricultural products covered by Annex I to the Treaty or cotton, except fishery products. So, support of investment in physical assets in the food industry has similar mission as sub-measure I.1.3.1 in the previous RDP (2007 – 2013). The total available public budget for investments in physical assets in the Czech food industry in the period 2014 – 2020 will be 85 363 324 EUR (2,8 % of the total RDP public budget of the Czech Republic). Support under the Co-operation measure No. 16 shall be granted in order to promote forms of co-operation involving at least two entities and in particular (selection):

- co-operation approaches among different actors in the Union agriculture sector, forestry sector and food chain and other actors that contribute to achieving the objectives and priorities of rural development policy, including producer groups, cooperatives and inter-branch organizations;
- the creation of clusters and networks.

So, the support of co-operation in the food industry has similar mission as sub-measure I.1.3.2 in the previous RDP (2007 – 2013). The total available public budget for co-operation in the Czech food industry in the period 2014 – 2020 will be 70 882 530 EUR, i. e. 2.3% of the total RDP public budget of the Czech Republic.

The national support of investments in the food industry in the Czech Republic is provided by the Ministry of Agriculture (support No. 13). Unlike RDP which supports small and medium enterprises, the national support is eligible for large companies. The national support focuses on improving the quality of processing of agricultural products listed in Annex I of the Treaty on the Functioning of the EU, increasing the competitiveness of food enterprises, respectively feed business in the European market, especially with regard to quality, safety and traceability of products, security of functionality, efficiency and quality systems. The national subsidies support

- modernization of production facilities, introducing new technologies,
- investments related to the diversification of production establishment into new additional products,
- investments related to a fundamental change in the manufacturing process of an existing establishment,
- the improvement and streamlining of procedures for the processing of agricultural products,
- investments to improve and monitor the quality of food products or feed,
- implementation environmentally friendly technology,
- implementation technologies related to the traceability of food products or feed.

The national support for large companies will coexist with RDP support in the new programming period. There are clearly defined competencies between the two supports.

4 Conclusions

Assessment of the FDI in the food sector in recent years has shown that the situation in 2013 compared with 2012 changed for the worse. Still, it appears desirable to input these investments in certain food production in order to continue in the technological "rearmament" improving the economic position of the sector and create conditions for stable growth.

The evaluation of the volume of investments in fixed assets expressed per one company (2012) reaches the manufacture of food products in the Czech Republic in comparison with neighbouring states the lowest values. In the same

indicator in the manufacture of beverages has a higher value than the Slovak Republic and Hungary, but only a quarter of the maximum value for Austria. Overall, development, structure, and international comparison of investments in fixed assets show a lack of financial resources.

The volume of subsidies in 2013 represents the amount of 836 mill. CZK (preliminary valuation) in comparison with the year 2012 in the amount of 990 mill. CZK, lower by 154 mill. CZK. The annual decrease occurred mainly subsidies from the RDP. It will be important to support investments in the food industry of RDP remained unchanged in the new programming period 2014 - 2020 and also continued support from national sources.

Acknowledgement

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Investment Activity and Labour Productivity of Small and Medium-sized Enterprises in the Food Industry

Martina Novotná, Tomáš Volek, Jana Fučíková[1]

Abstract*: The paper dealt with the link between the growth of fixed assets and labour productivity in small and medium-sized enterprises in the food industry The analysis was focused on 423 enterprises classified according to the European Commission as micro, small and medium enterprises. It was found that enterprises with long-term growth of fixed assets are characteristic by good profitability (ROA, ROE). The growth of fixed assets in these enterprises is financed from own resources. On the other hand, enterprises with decreasing size of the fixed assets are characteristic by lower profitability. Correlation analysis did not prove linear link between the change in fixed assets and changes in labour productivity in any of group of enterprises. On the contrary, correlation analysis have proved positive link between the change in capital-labour ratio and growth in the amount of fixed capital. Conclusion is that change of fixed assets has positive affect on capital labour ratio bud this positive effect not significant effect on labour productivity in enterprises.*

Key words: Investment · Labour Productivity · SME · Food Industry

JEL Classification: M21 · D24 · J24

1 Introduction

Good investment activity of enterprises is the basis for improving performance and efficiency of enterprises in any sector. The investment activity of enterprises should have a positive impact on increasing of capital-labour ratio and labour productivity. It is the question if the active investment activity leads to the labour productivity growth in small and medium-sized enterprises in food industry.

Labour productivity is the most common indicator to measure single-factor productivity. Labour productivity is relationship between growth in the labour force and growth in output per hour worked (Romer, 1990). Indicator of labour productivity shows the efficiency of utilization factors of production and the production possibility of all economy. Labour productivity we can write as GDP per employee (Belorgey, Lecat & Maury, 2006) or value added per labour (Broersma & Oosterhaven, 2007). There are two sources of labour productivity growth: technical progress and increases in the average capital–labour (K–L) ratio (Guest, 2011). Labour productivity is influenced by many shocks. There are two types of structural shocks: (1) technological shocks, that are changes in the technological progress which affects labour productivity in the long-run, and (2) non technological shocks, that is all the other shocks that affect labour productivity temporarily through its effects on capital accumulation and aggregate demand (Travagliny, 2012). Labour productivity can be affected by size of the enterprises (Mura & Rozsa, 2013) or by the type of enterprises ownership (Petrách & Leitmanová, 2013).

Investment is a dominant factor in the growth of enterprise performance. Without investment in times of crisis cannot particularly expect the growth in value added and competitiveness of enterprises (Merkova, Drabek & Polak, 2011). Investment is as essential to improving labour productivity. Investments in the enterprises we can divide into tangible and intangible investments. Some authors have found that investment in physical capital plays key role to growth in labour productivity (Turner, Tamura & Mulholland, 2013). Others authors has found the main role of foreign direct investment. Foreign investment tends to go to firms with above average initial productivity performance (Djankov & Hoekman, 2000). On the contrary, long time decreasing in labour productivity could lead to an economic crisis and rising unemployment (Siruček & Pavelka, 2013).

2 Methods

The main aim of this paper was to assess if the growth of fixed assets (investment activity) in small and medium-sized enterprises in the food industry influences the efficiency of the production factor (labour) and financial indicators of the enterprises. The analysis was focused on 423 enterprises classified according to the European Commission (Commission Regulation (EC) no. 800/2008) as micro, small and medium enterprises. It is enterprises which are classified according to the principal activity in section 10 - Manufacture of food products in the NACE-CZ. The data source was the

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business database Albertina. The observed firm's data were from the 6 year period (2007-2012) and the set of the 423 enterprises was for the whole observation period invariable.

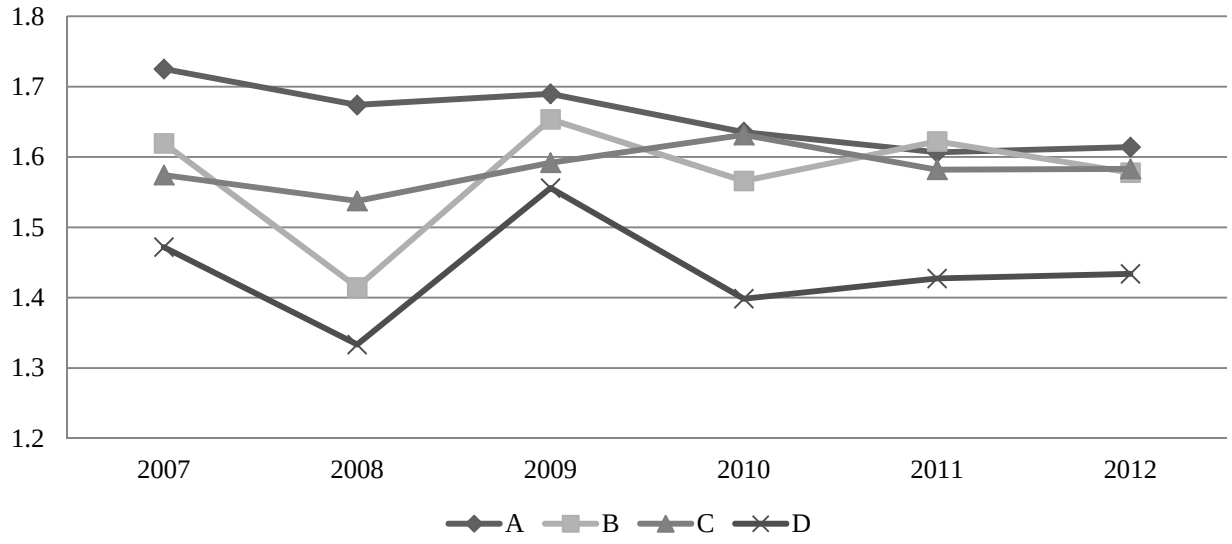
Investment activity was assessed by indicators of tangible and intangible assets, and according to the annual rate of growth. The enterprises were divided into 4 groups on the basis of these five annual indices. In the Group A are the enterprises in which dominates the growth of fixed assets (minimum three-year indices were greater than 1). The group B contains firms with the mainly declining fixed assets (minimum three-year indices were less than 1). The Group C of enterprises is based on the Group A, where the growth of fixed assets recorded at least 4 times. Mostly only in 2009, this growth was compromised. The Group D is subgroups of Group B. Enterprises of this Group B are characteristic by declining in the fixed assets at least in 4 indexes. The firms in this group did not invest practically. What is the distribution of firms in each group? The firms in the Group A represent about 40% of all firms and the 58 firms in the Group C (36% of the firms of the group A). Conversely, about 58% of the firms in the group B and about 35% of all analysed enterprises were firm where almost in all years the value of fixed assets decreasing (D).

The indicators of labour productivity and financial analysis were measured in the all analysed enterprises. The selected indicators of labour productivity were: Labour productivity I (value added / labour costs), Labour productivity II (total revenue/ labour costs), Capital-Labour ratio (tangible and intangible assets / labour costs). The selected indicators of financial analysis were: Return on assets (ROA = earnings before interest and taxes (EBIT) / total net assets), Return on equity (ROE = net profit/ equity), Total debt to total assets (total debt/ total assets). Correlation analysis was used to measure the relationship between indicators. The correlation analysis usually determines how strong is the linear relationship between the pairs of variables (Hindls, Hronová & Smith, 1999). The independence of the variables does not indicate impossibility correlation of variables. Between uncorrelated variables could be other than linear relationships (Hebák & Hustopecký, 1987).

3 Research results

The first analysis deals with the labour productivity I (Figure 1). There were found significant differences between the levels of labour productivity I. Group A, which restores assets and invests in fixed assets, has also the highest initial value of this indicator (1.72 CZK value added to 1 CZK labour costs). Group D, a group with declining growth rates of fixed assets, has the lowest level of this indicator (1.47 CZK). Development of the values of this indicator shows that in the last reporting year 2012, the groups A, B, C reached approximately the same level (1.6 CZK value added to 1 CZK labour costs), while group D lags significantly. The Groups A and C invests regularly (positive annual growth rate), Group B invest apparently fits and starts - not dramatically and Group D is not investing group).

Figure 1 Development of labour productivity I in CZK



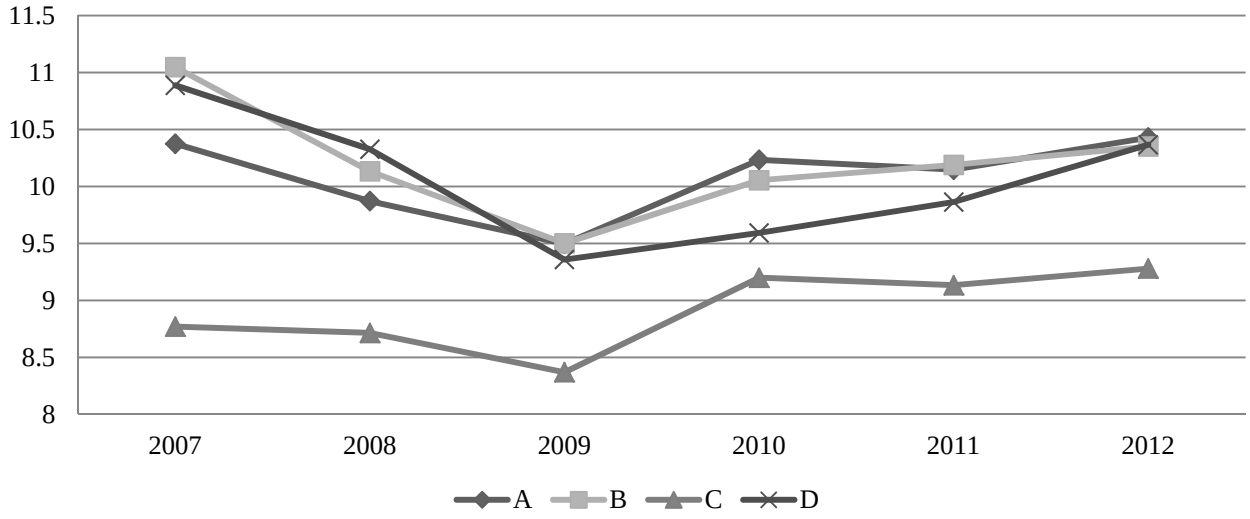
Source: Own processing

The development of labour productivity I growth rates shows that the development of this indicator in groups is different with more or less, but in the last reporting year are the differences minimal. It is clear that the growth rate of this indicator is the highest in 2009 primarily in enterprises of Group B and D. On the contrary, the growth rate

of indicator labour productivity based on total revenue declines. While the indicator of labour productivity based on added value was increasing, especially in enterprises of Groups B and D about 15%, labour productivity based on revenues decreased in all groups about 6%. The added value is represented by the difference between performance and performance consumption in the enterprises of food industry. In year 2009 declined both performance and performance consumption. The apparent contradiction with the growth of value added in this period was caused by the fact that the performance consumption declined faster than performance

The comparison of the level of labour productivity II between particular groups shows us an interesting fact. The most investing enterprises (Group C) had with comparison with the other groups' lower revenue on 1 CZK labour costs, throughout the followed period (Figure 2). The development of the indicator of labour productivity I and II show us that the result of investment activities of this group (Group C), led to increase of value added per 1 CZK labour costs. This effect can be understood as improving of the business activities.

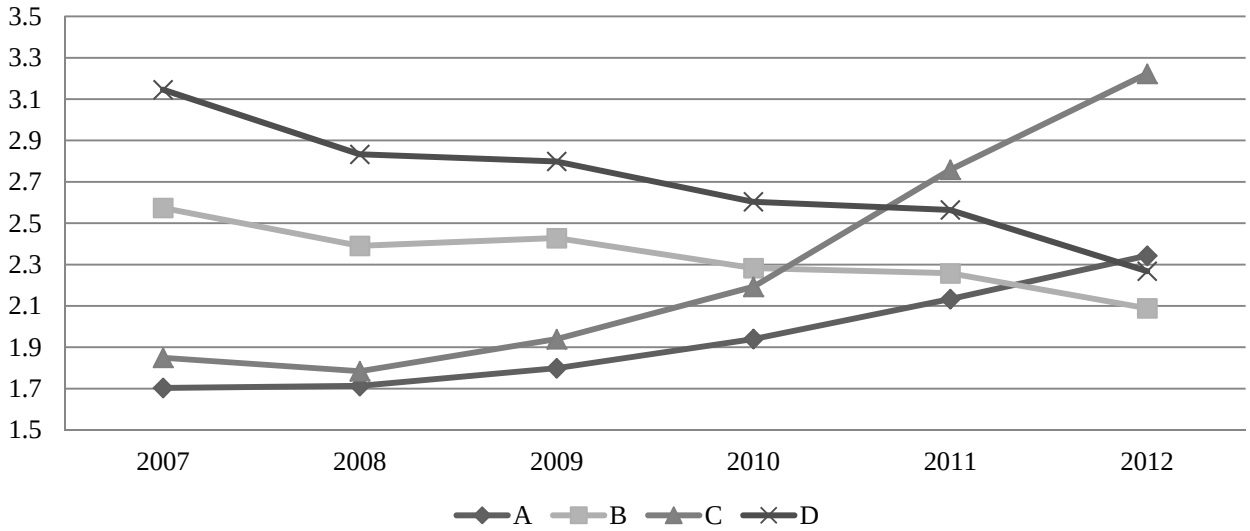
Figure 2 Development of labour productivity II in CZK



Source: Own processing

The Investment activity of enterprises affects the indicator capital-labour ratio. It was found that the value of indicator (C-L ratio) increased in the most investing group of enterprises (group C) and decreased in the enterprises with reducing of value fixed assets (Group D) (Figure 3).

Figure 3 Development of capital-labour ratio in CZK



Source: Own processing

The next analysis was focused on the financial ratio indicators in individual enterprise groups (Table 1). There are significant differences in the level of profitability ratios (ROA, ROE).

Table 1 Development of selected financial indicators by the group

Group	2007	2008	2009	2010	2011	2012
Return on assets (ROA)						
A	8.84	8.25	8.76	7.57	6.22	4.91
B	4.71	3.06	5.92	3.11	5.34	4.50
C	7.70	8.40	9.01	9.39	6.59	5.15
D	2.98	1.28	3.31	2.01	1.98	2.24
Return on equity (ROE)						
A	14.45	13.36	13.97	11.30	9.06	8.13
B	5.59	3.26	8.15	3.05	7.71	6.01
C	11.80	13.90	14.77	13.82	10.10	8.02
D	1.89	-3.22	3.04	0.95	1.66	1.97
Total debt to total assets (indebtedness)						
A	58.11	58.83	54.72	52.29	53.18	60.83
B	57.80	56.30	57.71	52.61	52.38	51.35
C	58.90	58.35	51.14	50.81	53.80	56.15
D	57.61	58.37	62.60	54.16	53.21	54.04

Source: Own processing

Table 1 shows that the level of total debt indicator has not connect with growth rate of fixed assets. It is not possible to confirm the assumption that the most investing enterprises have the highest indebtedness. Group C had a similar indebtedness with other groups. This implies that fixed assets are mainly financed from own resources. Significant differences are evident in the performance indicator ROA (Return on assets). This indicator is particularly high in the group of C and significantly lowest in the enterprise group D (In 2012, a difference of almost 3 percentage points, is even more pronounced in previous years). A similar situation can be seen from the development of values the ROE (return on equity), where the differences are even more pronounced. We have concluded that enterprises (Group C) are economically successful and may therefore make investments from its own resources. While firms in the group D are less successful enterprises which implies an annual decreasing of fixed assets.

The last analysis was conducted to determine the tightness changes of fixed assets depending on different variables. The correlation coefficients were calculated for individual enterprise groups (Table 2).

Table 2 The impact of investment activity on the dynamics of change in performance indicators (correlation coefficients)

	Labour productivity I	Labour productivity II	Capita-labour ratio	ROA	ROE	indebtedness
A	-0.01	0.14	**0.82***	-0.02	0.01	-0.04
B	0.1	-0.09	**0.69***	0.05	0.04	-0.09
C	0	-0.09	**0.89***	0.18	0.02	-0.16
D	0.04	**-0.19***	**0.61***	0.02	0.04	-0.02

Source: Own processing

The greatest degree of tightness of the linear relationship can be found between the indicators of change in fixed assets and change capital-labour ratio, which is not surprising conclusion. This tightness is highest among enterprises of Group C. Statistically significant (although the correlation coefficient is relatively low) is an indirect dependence in enterprises of group D between indicators of change in fixed assets and labour productivity II. For other indicators have shown a no linear relationship between the change in fixed assets and performance indicators, which does not mean that it is independent. We can only say there was no linear dependence.

4 Conclusions

The paper deals with the link between the growth of fixed assets and labour productivity in small and medium-sized enterprises in the food industry. It was found that enterprises with long-term growth of fixed assets are characteristic by good profitability (ROA, ROE). The growth of fixed assets in these enterprises is financed from own resources. On the other hand, enterprises with decreasing size of the fixed assets are characteristic by lower profitability. Correlation analysis did not prove linear link between the change in fixed assets and changes in labour productivity in any of group of enterprises. On the contrary, correlation analysis proved link between the change in capital-labour ratio and growth in the amount of fixed capital. Conclusion is that change of fixed assets has positive affect on capital labour ratio bud this positive effect not significant effect on labour productivity in enterprises.

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Land Rent Development in the Period 2011 – 2013

Radek Zdeněk, Jana Lososová, Daniel Kopta[1]

Abstract*: The article deals with the growth of land rent in the period 2011 – 2013 of the selected farms. The growth rate of land rent is compared with the growth rates of other economic indicators and evaluates the influence of hectare land rent, the share of rented land and production on the change of land rent costs. There was found, by testing the statistical influences of 22 factors, that the fertility expressed in official prices, the proportion of land in Less Favoured Areas (LFA) and the associated altitude, the share of agricultural land in a municipality, the share of arable land of a farm and the share of rented land have had the largest effect on the price of land rent. This amount in the basic period affects most significantly the land rent growth within the period 2011 – 2013.*

Key words: Land Rent · Price of Land · Agricultural Land · Land Rent/Revenues Ratio

JEL Classification: Q14 · Q15

1 Introduction

The Czech Republic is a country consisting of a large number of small landowners, most of whom do not farm the land themselves. Within the EU, the share of rented agricultural land is almost doubled in the Czech Republic. Currently, the main competitive advantage is, in addition to the size of a farm, the lower cost of land as well as the land rent, which has been increasing significantly in recent years. There are two types of land prices set on the Czech land market. The official price, set according to land fertility is published by the Ministry of Finance price regulations and the market prices based solely on supply and demand interaction. The amount of land rent is regulated by the Law no. 229/1991 Coll., based on the adjustment of the ownership of the land and other agricultural properties, in later versions, where the rent is set at 1% of the official price of agricultural land unless the owner and the tenant agree otherwise. As of October 1st 2014, the State Land Office (SLO) changes the annual land rate for agricultural land with a competence to farm from 1% to 2.2% (SLO, 2014). The ongoing increase in decoupled payments and the increase in major crops prices are the main reasons for the growth of land rent level. However, due to the multi-annual rent agreements set with a fixed growth coefficient, the rent price does not react immediately to the annual price changes and market development. The land rate, as one of the cost items, has a direct impact on farming profitability and is also an indicator of interest for both the landowners and farms.

2 Literature and Methodology

Factors affecting the land price as well as the land rent are, in addition, indirectly related to the production which was researched by Huang et al. (2006). Land productivity, land size, distance from major cities, index city–countryside, farms density, income and inflation were set as explanatory variables in the analysis. The regression shows that land prices are positively correlated with land productivity and population density. On the other hand, however, it is inversely correlated with the land size, rural character of a district and the distance from city centres. Craig et al. (1998) regressed the land prices as a function of land type, terms of trade, traffic conditions and geographic and demographic factors. Land rent is defined as a price of land paid annually for generally observed factors such as land productivity or size of the land but also the profitability of the products associated with it (for example cattle, pig and other domestic animals breeding). Non-agricultural land use is introducing the distance from major cities, population density in the region, urbanization rate in the region and income not related to farming as the factors influencing the land price. Empirical evidence may therefore include a broad range of agricultural and non-agricultural factors. In addition to the existing factors, future factors can also be evaluated. The production structure seems to have a significant impact on the agricultural land rent. Pace et al. (1998) discussed the measures related to structural changes in agriculture and livestock along with the other factors like consumer prices or pig density. Land rent and land prices are derived not only from the current land use but also from the potential future use.

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Hamza & Miskó (2007) describe the adjustment of land rent in Hungary during the entry into the EU. The rents are bound to a yield and the price of wheat grain on the grain exchange in the middle of summer. Many landowners do not agree with such price setting and prefer the fixed amount such as a certain percentage of subsidies (40% – 50% in this case). Stoyneva (2007) points out that the rent situation in Bulgaria is similar to Hungary. There are no significant differences in land rents across the regions and the rent mainly depends on the agricultural income level. The rent amount is mainly determined by the demand and is neutral towards supply. In many developing countries the rent represents more than 40% of gross annual production. Boinon et al. (2007) analyses the impact of the Common Agricultural Policy (CAP) reforms on the land rent and the land market and concludes that subsidies increase the demand for land and thus affect the value of rents and land prices. Ciaian et al. (2010) analyses the effect of CAP on the agricultural land prices and the land rents across the EU states. The results of the study show that the introduction of a single payment scheme on the area has a greater impact on rents than on land price. Studies conducted by Happe & Balmann (2003), Roberts et al. (2003), Lence & Mishra (2003), Barnard et al. (2001) and Featherstone & Baker (1988) demonstrate the positive impact of direct payments on the rent. Clark et al. (1993) analyses the factors influencing the development of the land market and rent prices. The payments linked to the production and decoupled payments have a different influence on rents due to the fact that a different production is associated with such payments. Patton et al. (2008) states, that the land rent is theoretically regarded as a function of expected market revenues and direct payments related to such revenues. The influence of direct payments linked to the production and decoupled payments on rents in years 1994 – 2002 was analysed by the authors in Northern Ireland. The results indicated that the impact of direct payments on the land rent is different with respect to the type of a payment. Sklenička et al. (2013) regressed the impact of eight variables (municipality size, the size of a parcel sold, soil quality stated by official prices, the distance between a sold parcel and the edge of settlement, the accessibility of the land, travel time to Prague, travel time to a regional town, travel time to a district town) on the price of agricultural land in the Czech Republic using linear regression model. The results showed that the most influential factor in terms of land price is the distance from a current settlement. Other significant factors were: the size of a municipality, the distance from the capital city, the accessibility of the land and the land fertility. The results were interpreted by setting a threshold value for significant factors that support future non-agricultural use of land and significantly boost the current price of the land.

The purpose of this study was to determine the growth rate of land rent among the observed sample of farms within the last three years and the identification of factors that significantly affect the land rent and its growth. The raw data regarding the land rent are mainly collected from three public databases: Eurostat, DG AGRI and FADN. The paper uses own sample survey data of local agricultural farms complemented by the data from the Czech Statistical Office, the Czech Office for Surveying, Mapping and Cadastre and from the application www.mapy.cz. The influence of the below stated variables on the rent amount was tested [CZK/ha]: rented land area [ha]; share of rented land; share of arable land in farm; share of land in LFA in farm; share of plant production revenue; share of animal production revenue; revenue share from non-agricultural production; operational subsidies per hectare of agricultural land [CZK/ha]; share of arable land in the municipality; share of arable land in district; share of land in LFA in district; altitude [m]; land official price [CZK/m^2]; municipality size [number of inhabitants]; municipality area [ha], agricultural land share in the municipality; agricultural land share in district; distance to the capital; distance to regional centre; distance to district centre; distance to municipality with extended competence; distance to municipality with authorized municipal office [km].

Land rent/revenues ratio (c) is defined using three analytical indicators; land rent per hectare, share of the rented land and production intensity. Land rent per hectare (l) [CZK/ha] is defined as the share of costs on the land rent and the area of rented land; the share of the rented land (s) is a share of rented land area and the total acreage of cultivated land; intensity of production (p) [CZK/ha] is the share of the volume of production and acreage of cultivated land,

$$c = l \cdot s : p. \tag{1}$$

Using the indicators stated above, the change in land rent cost (c_{2013}) since 2011 (c_{2011}) can be determined,

$$\Delta c = c_{2013} - c_{2011} = \Delta c^l + \Delta c^s + \Delta c^p, \tag{2}$$

where Δc^l represents the change in land rent caused by the land rent costs per hectare; Δc^s is a change in land rent costs influenced by the proportion of rented land; Δc^p is a change in land rent costs determined by the production intensity. The influence of analytical indicators on the change in land rent costs are calculated using index logarithm methods,

$$\Delta c^l = \ln (l_{2013} / l_{2011}) / \ln (c_{2013} / c_{2011}) \cdot \Delta c,$$

$$\Delta c^s = \ln (s_{2013} / s_{2011}) / \ln (c_{2013} / c_{2011}) \cdot \Delta c,$$

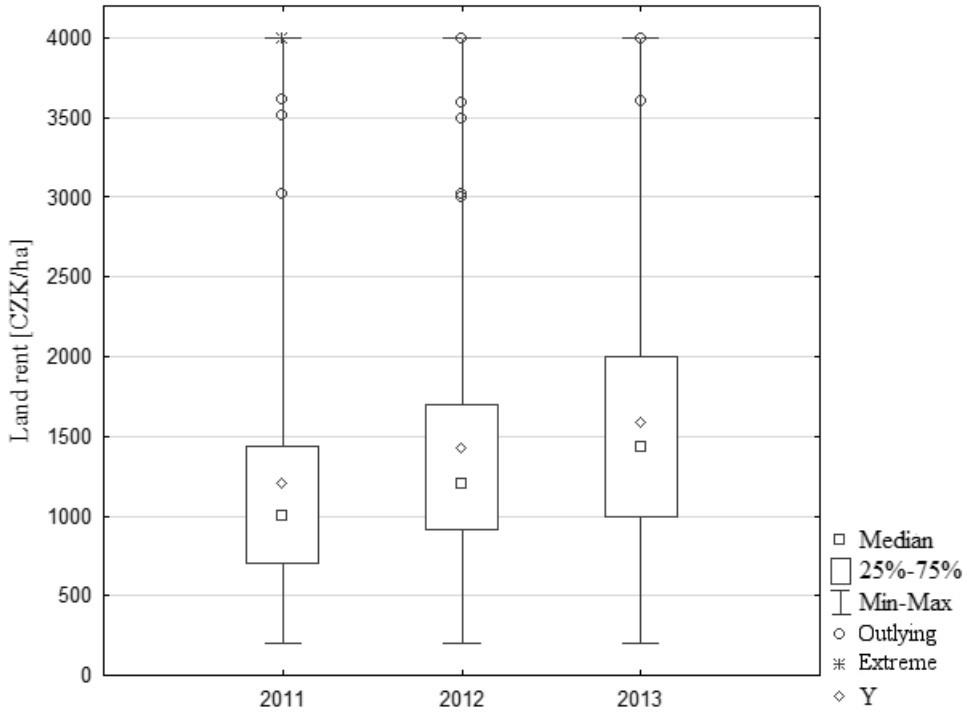
$$\Delta c^p = -\ln (p_{2013} / p_{2011}) / \ln (c_{2013} / c_{2011}) \cdot \Delta c.$$

3 Results

The sample contains 52 identical farms in 2011 – 2013 out of which 26 are cooperatives, 18 are joint-stock companies, 7 are limited liability farms and 1 is individual. These farms operate in 9 regions of the Czech Republic. There are 31% of the farms operating outside the LFA area, 23% are operating within the mountain LFA region, and 46% in LFA in other regions. The average profit before tax per hectare in 2013 reached 5569 CZK which is a 16% increase compared to 2011. The average operating subsidies in 2013 amounted to 8767 CZK/ha, which is a 9.5% increase since 2011. The average farm operated on 1828 ha of agricultural land out of which 87% consisted of rented land. Such a ratio is a 3% decrease compared to 2011, where the rented land ratio reached 90%. In comparison with 2011 the average size of agricultural land decreased to 98.6% and the size of arable land decreased to 95.4%. The annual land rent averaged 2.848 million CZK, a 21% increase compared to 2011. Yet land rents are among the less significant cost items, the average rent cost ratio is 0.027 and the average growth rate of rent costs is 10.2% annually. The average growth rate of land rent per hectare reached 15% with profits rising only by an average of 7% per annum, operating subsidies grew by 4% p.a. and production grew by 3%.

The average land rent increased from 1200 CZK (2011) to 1422 CZK (2012) and later to 1586 CZK (2013) increasing by approximately 15% annually. The distribution of land rents is characterized by mild right-sided skewness and higher kurtosis, both of which are decreasing in time. The sample median grew from 1000 CZK (2011) to 1200 CZK (2012) and to 1433 CZK (2013). The mode value of the land rent is 1000 CZK/ha (decreasing in time to mode frequency of 6). The range of the sample is stable during the observed period, ranging from 200 CZK/ha to 4000 CZK/ha (figure 1). The hypothesis of consistent distribution of land rent in each year is rejected by Friedman's ANOVA (p-level < 0.001).

Figure 1 Land rent box diagram



Source: The own survey of selected farms

Table 1 shows the basic characteristics of the explanatory variables. The size of the municipality and especially the municipality inhabitancy show a very high variability. A number of explanatory variables represent a strong degree of mutual statistical dependence, out of the corporate indicators for example share of arable land and subsidies received ($r = -0.72$).

Out of the individual factors the land rent indicates the highest dependency rate on the official land price, where $r = 0.71$. Tenant farmers and landowners therefore use the official price as the basis for determining the rent amount. As mentioned earlier the statutory rent is 1% of the official agricultural land price unless the parties agree otherwise. The average rent within the observed sample amounted to 2.4% of official price in 2011 and 3% in 2013. In all farms the land rent is higher than the statutory value. In 2013 19% of the farms stated that the land rent is lower than the newly set

rents of the land managed by the State Land Office (2.2% of the official land prices). In 2011 3 farms exceeded the 5% land rent rate; in 2013 9 farms exceeded such rate (figure 2) the maximum value peaked at 14.3%. Various production and climate management conditions as well as different economic indicators of the farm were observed when comparing the farms with land rents higher than 2.2% of official price. Conversely the farms with the rent higher than 5% of the official price are characterized by weaker production and climatic conditions poorer land fertility with 95–100% of the acreage in LFA and with the exception of one farm below-average income and earnings per hectare.

Table 1 The basic characteristics of explanatory variables in 2013

Indicator	Average	Minimum	Maximum	The coefficient of variation (*v*)	Land rent dependence on the indicator (*r*)
Rented land area [ha]	1591	381.7	4301	59.2	0.426**
Rented land share	0.87	0.36	1	12.6	−0.103
Share of arable land in farms	0.668	0	0.993	38.4	0.443**
Land share in LFA	0.6895	0	1	61.8	−0.595***
Share of plant production revenue	0.37	0	0.98	63.1	0.369**
Share of animal production revenue	0.49	0	0.95	48.4	−0.324*
Share of other revenue	0.14	0	0.95	134.0	−0.054
Operational subsidies / agricultural land area [CZK/ha]	8948	6314	16773	25.5	−0.049
Altitude [m]	470	230	850	27.6	−0.465***
Official price [CZK/m^2]	5.31	1.39	13.58	60.6	0.71***
Share of arable land in the municipality	0.71	0.21	0.94	27.1	0.348*
Share of arable land in district	0.69	0.37	0.92	22.7	0.236
Share of land in LFA in district	0.69	0	1	46.1	−0.378**
Number of inhabitants in municipality [inhabitants]	1911	110	14099	159.4	−0.188
Municipality area [ha]	2103	567	6113	69.5	−0.135
Agricultural land share in the municipality	0.59	0.20	0.92	30.2	0.496***
Agricultural land share in district	0.52	0.34	0.71	21.4	0.275*
Distance to the capital [km]	139.2	14	287	41.9	−0.105
Distance to regional centre [km]	48.5	8	106	47.0	−0.105
Distance to district centre [km]	18.0	0	37	50.5	−0.327*
Distance to municipality with extended competence [km]	12.1	0	31	61.9	−0.112
Distance to municipality with authorized municipal office [km]	8.8	0	27	64.8	−0.141

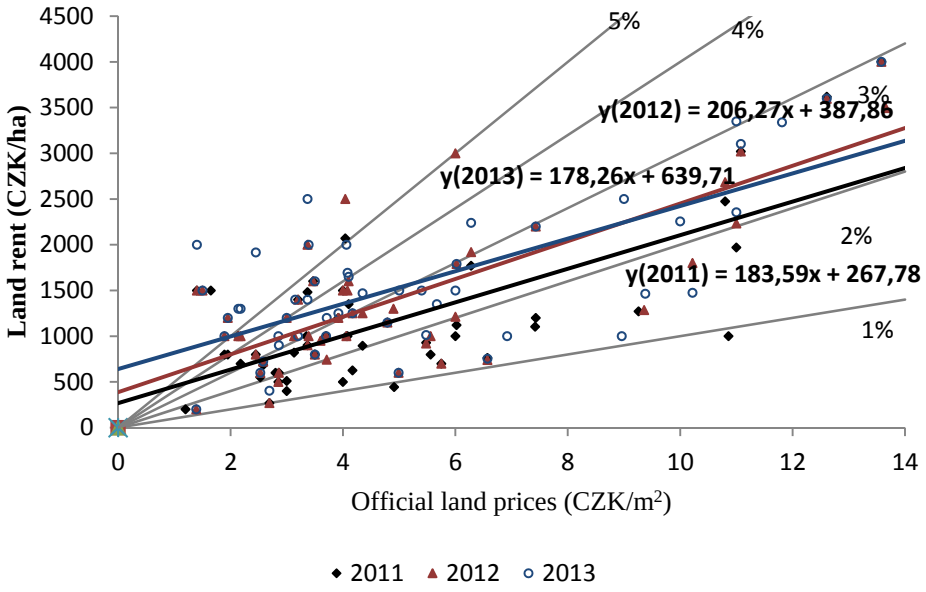
Source: The own survey of selected farms

Note: The achieved significance of hypothesis H_0: $r = 0$, H_A: $r \neq 0$, * - *p*-level < 0.05; ** - *p*-level < 0.01; *** - *p*-level < 0.001.

Another factor on which the land rent has a higher degree of dependence is the share of land in the LFA, where $r = -0.595$, the share of agricultural land in the municipality ($r = 0.496$), mean altitude ($r = -0.465$), arable land share ($r = 0.443$) and rented land area ($r = 0.426$).

A cost of rents is affected by three factors, namely hectare rents, the share of rented land and the intensity of production that among the firms operate differently. The rent per hectare and the share of rented land is in direct relation with the land rent/revenues ratio. The land rent/revenues ratio and production intensity are in an indirect relationship.

Figure 2 The relationship between land rent and official land prices

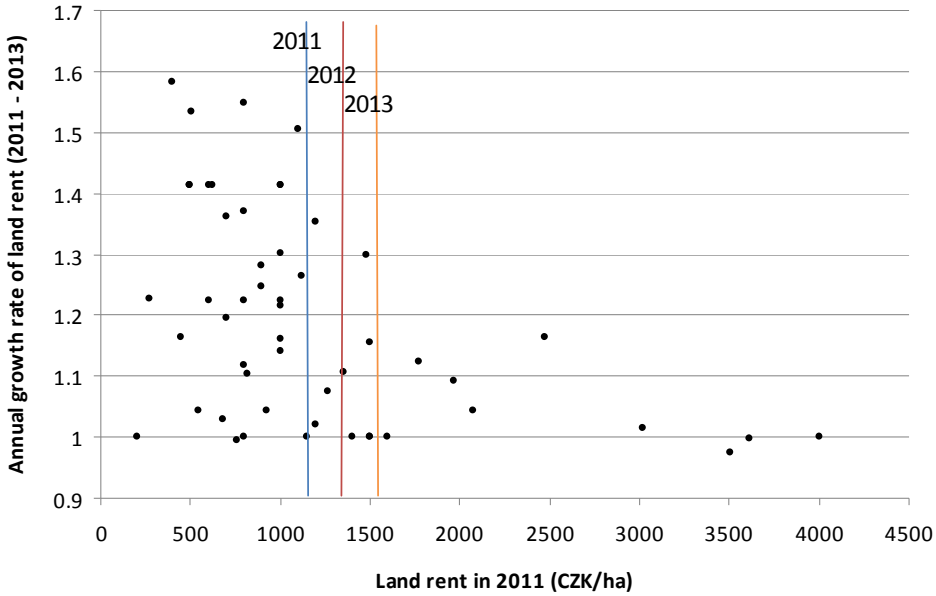


Source: The own survey of selected farms

Based on the above methodology, the land rent/revenues ratio for the average farm increased from 0.02419 in 2011 to 0.02744 in 2013 (i.e. about 0.00325) therefore an increase in cost ratio of rented land occurred in 71% of farms. There is a crucial influence of the rents per hectare, which explains an increase in the cost ratio of rents by 0.00633. Negative effect (i.e. the reduction of land rent cost ratio due to declining land rent) occurs only in 5.8% of cases and zero effect in 15.4% of the cases. The effect of land rent is partially compensated by an increasing production intensity (−0.00209) and the production intensity helps to decrease the land rent cost ratio in 78.8 % of cases. There is a negative effect of the land rent share and the share reduction caused a decline in land rent cost ratio by −0.00099 (an increase in the share of rented land and thus to a positive effect on the growth of land rent cost ratio occurred in 9.6% of cases).

The land rent increase in the observed period is shown in Figure 3, where the vertical line shows the average land rent. The land rent in the farms in which it was previously below average grew the fastest.

Figure 3 The relationship between land rent and its growth rate



Source: The own survey of selected farms

4 Conclusion

In conclusion, the land rent growth, along with the growth in land prices, affects the majority of the Czech farms due to the high percentage of rented land. Despite the fact that these farms are trying to acquire the rented land and so the share of rented land is decreasing annually, such a share percentage is still high above the EU average. Farmers fear that the land rent costs may negatively affect their farm plans in the near future, and therefore, the article is trying to analyse the land rent development and define the most influential items behind the land rent procedure. Regardless of the limited data available (using the database of the agricultural farms within 2011 – 2013) it is clear that the land rent growth rate significantly exceeds the growth rate of profit, revenues and subsidies.

Out of the observed factors, the biggest positive influence on the land rent change (an increase in rent cost ratio) is caused by land rent per hectare. Conversely, the negative influence (a decrease in rent cost ratio) is mainly determined by the production and by the share of land rented. In the majority of cases, the land rent share affects the land rent cost ratio negatively. On the other hand, however, there are four farms where the land rent share had a positive effect on land rent cost ratio due to an increase in land rent share. The production positively affects the land rent cost ratio in 10 cases, out of which the majority reported a decrease in annual production within the observed period.

Out of the tested indicators, land rent is most dependent on official land price. Within the observed period, all farms report land rent higher than 1% of the official price. The other significant factors with higher degree of correlation with land rent are: land share in LFA, agricultural land share in municipalities, average altitude, rate of arable land in farm and the area of rented land. In addition, when comparing the farms with highest land rent growth, it is evident that such companies are among those having below average land rent costs in the basic period.

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The Impact of Price Changes on the Results of Agricultural Enterprises

Martina Novotná, Jaroslav Svoboda[1]

Abstract*: Agriculture is one of the traditional sectors of the economy. Agriculture today is not only to produce food but takes on itself and other functions, such as community, social or environmental ones. Agricultural activity is also an integral part of the rural area. The performance of these production functions is supported by many farmers' subsidy instruments (national or European). The Czech agrarian sector has undergone significant changes in the last few decades.*

The aim of this paper is to analyse revenues, costs and profit/loss of farms in current prices and in comparable prices. The data base consists of a sample of about thousand observations from 2005 to 2013. The result was an established fact, when using the deflated costs and revenues items, there was a significant drop in profit/loss. At current prices entities realized gain (except in 2009), but the conversion was getting into losses. The economics of agricultural enterprises is, therefore, in addition to climatic conditions significantly affected by price fluctuations, which clearly demonstrated the contribution.

Key words: Agriculture · Common Agricultural Policy · Cost · Revenues · Profit/Loss · Prices ·Farms

JEL Classification: M41 · Q14

1 Introduction

Business is a process that depends on a lot of internal and external factors partly possible and partly impossible to influence. It is important for the management to be able to channel or use influence of such factors for successful future development. An analysis of economic effects and processes in an enterprise is important for successful management. Economy of farms is specific so that it is important to consider such special aspects in the analysis.

Management of agricultural enterprises has its own characteristics, which must be taken into account in the analysis. Agriculture in Europe, respectively in the Czech Republic should fulfil a number of functions. These may include contributing to an adequate supply of high quality food at competitive market, the preservation of valuable cultural landscape in Europe through sustainable management of soil and helping rural areas to remain viable but become attractive. At the same time, however, agricultural changes, that force farmers to adapt to new conditions and at the same time take advantage of new opportunities, may occur. The Common Agricultural Policy of the European Union focuses in response to public demand for sustainable agriculture in Europe by increasing the competitiveness of the agricultural sector, supports safe and secure sufficient food supply, preserving the environment and landscape, while trying to support living standards of rural communities (European Commission, 2009).

The majority of farms in the regions showed to a certain extent a dependence on the amount of subsidies provided. An appropriately chosen subsidy policy at the European and national level for the coming period may therefore significantly contribute towards the better performance of the majority of Czech farms, but on the other hand an inappropriately chosen subsidy policy may negatively influence the economic performance of Czech agriculture. Without subsidies coming from European and national sources, the economic results of Czech farms would be showing negative figures, so subsidies definitely are contributing towards the increased stability of farmers' income (Svatoš & Chovancová, 2013).

The increase in prices of agricultural producers means a sort of benefit for agricultural producers. If the benefit is real will be decided by the developments in supply of products and services for agriculture (farmers receive in exchange for their production). If the real term of trade index is less 1, then manufacturers will get less production for agriculture for the same amount of realized agricultural production (Jílek & Moravová, 2007).

Prices vary over time, so economic aggregates expressed in current prices do not enable us to determine to what extent the variations observed over a certain historical period (year, month, etc.) are due to variations in quantities. Conse-

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quently, economic statistics focuses not only on aggregates expressed in current prices, but also on the trend of the volumes and the associated price variations or variations in prices (Giovannini, 2008).

The results of analyses (Subervie, 2007) highlight a significant negative effect of the world price instability on supply, and further show that high inflation, weak infrastructure and a poorly developer financial system exacerbate this effect. This suggests that producers' vulnerability to world price volatility may be reduced through the improvement of the macroenvironment.

2 Methods

The aim of this paper is to analyse revenues, costs and profit/loss of farms in current prices and in comparable prices. Using appropriate price indices were recalculated costs and revenues on the one hand to the prices of the previous period and the other hand in the prices of the 2005. Individual (most important) cost items were recalculated as follows: production consumption through the index of prices of supplies and services for agriculture; conversion of personnel costs was used Consumer price indices of goods and services; depreciation was recalculated index of consumption of fixed capital - by section 01 Crop and animal production, hunting and related service Activities (CZ-NACE). For other costs was used index of prices of supplies and services for agriculture. Index of consumption of fixed capital by section 01 (CZ-NACE) was calculated through the consumption of fixed capital indicators published in the annual national accounts. Other price indices are published by the CSO (Czech Statistical Office). Revenues were adjusted Agricultural producer prices index.

Relations between the developments of two price levels can then be assessed by comparing price indices. Comparison of changes in the exchange of mutual benefit agricultural production for production purchased by agricultural producers is carried out using the real terms of trade index

$$I_T = I_Z : I_V , \tag{1}$$

as:

I_T stands for the terms of trade index

I_Z stands for the agricultural producer price index

I_V stands for the index of prices of supplies and services for agriculture.

The annual rate of growth in prices of the previous period is identified as such in 2007 as a proportion of revenues 2007 calculated in 2006 prices 2006 $R_{2007(2006)}$and revenues in 2006 ($R_{2006(2006)}$ i.e.

$$IR_{2007/2006} = \frac{\mathrm{R}_{2007(2006)}}{\mathrm{R}_{2006(2006)}}. \tag{2}$$

The data were collected (in period 2005 – 2013) from copies of financial statement (Balance sheet, Profit /loss statement) and an original questionnaire with detailed data on total characteristics. The database of farms has been collected at our department for several years and consist 977 observations. Enterprises in the sample are legal entities; their acreage of agricultural land is an average of about 1800 ha and managed at an altitude of 455 m above sea level. The data was processed by software MS Office - MS Excel.

3 Research results

3.1 Costs and revenues

Indicators are a tool for assessing the performance of farms. They can be characterized as absolute, ratio or a system of indicators. Accounting provides various input data in the form of the absolute values of variables. Detailed information on the structure of assets (assets) and sources of its coverage (liabilities) is recognized in the balance sheet. This statement, together with the profit/loss statement (income statement) and Annex are obligatory parts of the financial statements. The formal content is stated by the Regulation No. 500/2002 Coll., as amended.

In the past, the profit was considered a leading indicator of business performance. Current models tend to use rather general indicators, in which the profit is still included. Detailed information on the structure of the profit/loss and its parts is recognized in the profit and loss account (income statement). The statement includes a structure of costs and revenues, mostly in the form of the species. This analysis is now divided into two components – costs and revenues (table 1 and 2).

The table 1 shows absolute value and vertical analysis of the costs. The overall average absolute value ranged to approximately about 82 million CZK with less than 2% growth (1.67%), which can be evaluated positively at a glance. The production consumption was growing item (2.3%), which includes material and energy consumption and cost

of services. Its share is on average around 53% of the total cost. It's not surprising as it is essentially production enterprises. Given that farms are not primarily focused on the sale of goods, this cost item was included only marginally.

Table 1 Analysis of costs

Item	2005	2006	2007	2008	2009	2010	2011	2012	2013	Ø	Ø growth
Absolute value (thousand CZK):											
Costs, total:	77 623	75 640	84 341	88 948	76 589	75 887	79 963	89 906	88 633	**81 948**	**1.67%**
- Production consumption	41 112	40 304	45 663	48 284	39 247	39 206	42 578	48 045	49 507	**43 772**	**2.35%**
- Personnel costs	18 787	18 616	20 239	20 631	18 279	18 204	18 173	19 569	19 261	**19 084**	**0.31%**
- Depreciation of assets	8 044	8 057	8 892	9 113	9 259	9 296	9 177	10 483	10 454	**9 197**	**3.33%**
- Other costs	9 679	8 664	9 547	10 919	9 803	9 181	10 035	11 809	9 411	**9 894**	**-0.35%**
Vertical analysis (in %):											
Costs, total:	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**	**0.00**
- Production consumption	52.96	53.28	54.14	54.28	51.24	51.66	53.25	53.44	55.86	**53.35**	**0.67**
- Personnel costs	24.20	24.61	24.00	23.19	23.87	23.99	22.73	21.77	21.73	**23.34**	**-1.34**
- Depreciation of assets	10.36	10.65	10.54	10.25	12.09	12.25	11.48	11.66	11.79	**11.23**	**1.63**
- Other costs	12.47	11.45	11.32	12.28	12.80	12.10	12.55	13.13	10.62	**12.08**	**-1.99**

Source: Own processing

Almost 23% of the whole is attributable to personnel costs. The average number of employees, however, recorded a decrease of approximately about 5-6% (average values decreased from original 81 to 59 in the last year of the research). That is why there was a higher share initially. It gradually decreased, however, recently it increased slightly due to wage increases (the growth rate was less than 1%). Here, however, it has to be noted that wages in the agricultural sector are one of the lowest in the entire national economy (Novotná & Svoboda, 2014).

Depreciation (accounting) are the third most important cost items - not just for farms, but also in general. They are related to the annual wear of fixed assets and derived from their entry price. Their share is about 11%, however the growth rate is not high (at about 3 %). but their growth can be evaluated positively. The development is due to purchase of fixed assets, which replaces often much worn old assets (mostly machinery and buildings). To support the recovery, but also purchase of new assets subsidy programs are used by farmers. Purchasing property often leads to co-financing. Own funds of the farms are often very limited, it is necessary to use foreign financing in most cases, including bank loans. The price of loans is then interest costs, included in financial costs (other costs).

Items of tax costs excluding income taxes are not too important, as well as other costs (reserves, provisions, accruals. net book value of fixed assets and material, financial and extraordinary revenues, etc. – all in other costs with about 12% of the total costs).

Table 2 Analysis of revenues

Item	2005	2006	2007	2008	2009	2010	2011	2012	2013	Ø	Ø growth
Absolute value (thousand CZK):											
Revenues, total:	80 837	78 054	91 698	93 804	75 513	79 436	86 852	96 584	96 336	**86 568**	**2.22%**
- Sales	56 585	52 990	63 241	61 379	47 222	52 402	57 402	66 163	64 811	**58 022**	**1.71%**
- Other operating revenues	12 461	14 106	15 492	15 977	15 511	15 610	14 916	15 770	18 498	**15 371**	**5.06%**
- Other revenues	11 792	10 958	12 965	16 448	12 780	11 424	14 534	14 652	13 027	**13 175**	**1.25%**
Vertical analysis (in %):											
Revenues, total:	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**	**0.00**
- Sales	70.00	67.89	68.97	65.43	62.53	65.97	66.09	68.50	67.28	**66.96**	**-0.49**
- Other operating revenues	15.41	18.07	16.90	17.03	20.54	19.65	17.17	16.33	19.20	**17.81**	**2.78**
- Other revenues	14.59	14.04	14.14	17.53	16.92	14.38	16.73	15.17	13.52	**15.23**	**-0.94**

Source: Own processing

The table 2 shows absolute value and vertical analysis of the revenues, while the overall average absolute value ranges to approximately 86 million CZK, with less than 2.5% growth rate (2.22%). Productions are the most frequent component of revenues. They involve sales of own products and services, changes in inventories of own production (sales) and activation. Regarding the item of change, it is worth mentioning some specifics of farms which often occur in the minus value. This happens due to removal of semi-finished products of previous periods. Sales of farms are about 67% of total revenues, with growth less than 2%. The second most important item of revenues is operating subsidies (accounted in other operating revenues) with about 18% of total revenues and growth rate less than 3%. It item has already been generating a profit for several years. With the entry into the EU and adoption of the principles of the Common Agricultural Policy subsidies have been increasing (according to the agreed pre-accession scheme) and then they have become ever more essential for farmers.

Again, the remaining items of revenues (other revenues) include income rather uncertain due to sales of property and equipment, financial revenues (or the particular possible evaluation of available funds) and extraordinary revenues (mainly payments for claims, i.e. operations of damage due to flooding or extreme drought, animal mortality due to diseases, etc.).

3.2 Development of the prices indicators

In this part of the price indices were determined (see Methods), which were modified through relations between chain and basic indexes into desired forms The index in 2005 – 2012 was adjusted as chain indexes (table 4) and basis indexes with a basis in 2005 (table 3).

Table 3 Basis price indexes (2005=100%)

Item	2006	2007	2008	2009	2010	2011	2012
Agricultural producer prices index	1.011	1.181	1.285	0.966	1.018	1.212	1.262
Agriculture input prices of goods and services	1.005	1.064	1.179	1.088	1.068	1.157	1.207
Consumer price indices of goods and services	1.025	1.054	1.121	1.133	1.149	1.171	1.21
Index of consumption of fixed capital - by section 01	1.064	1.027	1.024	1.077	1.062	1.062	1.066
Terms of trade index	1.006	1.110	1.090	0.888	0.953	1.048	1.046

Source: Own processing

The development of selected basic price index shows prices expected to increase compared to 2005. Although the largest increase was in the last reporting year (2012) recorded for Agricultural producer prices (about 26.2%) and in some years. Agriculture input prices of goods and services are greater than the index. This follows from the terms of trade index (2009. 2010).

Table 4 Year-to-year change (Chain indexes)

Item	2006	2007	2008	2009	2010	2011	2012
Agricultural producer prices	1.011	1.168	1.088	0.752	1.054	1.191	1.041
Agriculture input prices of goods and services	1.005	1.059	1.108	0.923	0.982	1.083	1.043
Consumer price indices of goods and services	1.025	1.028	1.064	1.011	1.014	1.019	1.033
Index of consumption of fixed capital - by section 01	1.064	0.965	0.997	1.051	0.986	1.000	1.004
Terms of trade index	1.006	1.103	0.982	0.815	1.074	1.099	0.998

Source: Own processing

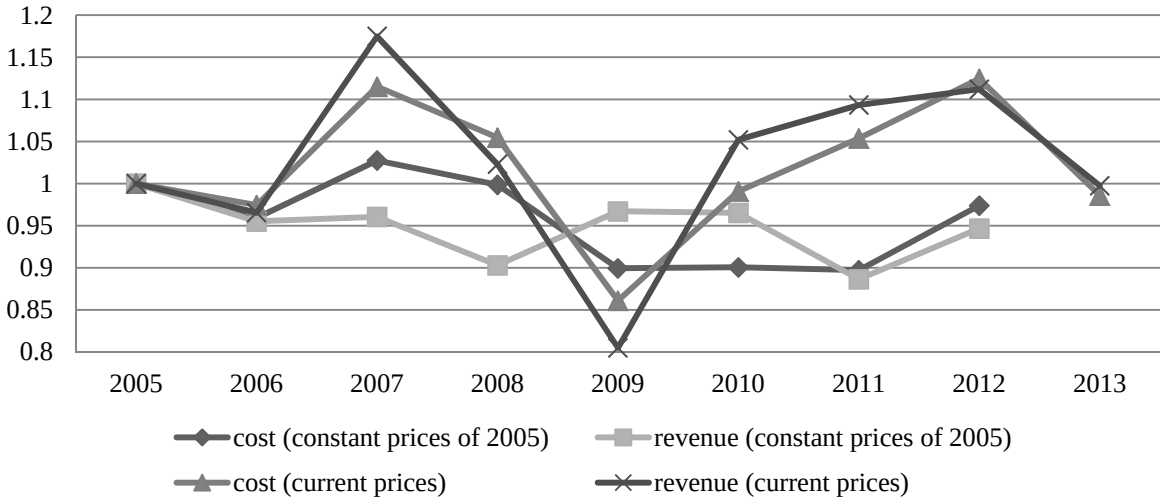
The development of annual indices i.e. comparisons of prices of agricultural producers in a given year compared to the previous situation does not seem so negative, except for 2009 when prices fell sharply (by almost 25%). Whether the benefits of increasing the prices of agricultural products are real is a fact of price developments of Agriculture input prices of goods and services. Comparison of Agricultural producer prices and Agriculture input prices of goods and services leads to the construction of indices of terms of trade from which it follows that farmers implemented shifts unfavourable for them especially in 2008 and 2009, namely for agricultural products receiving less supply of products and services for agriculture.

3.3 Impact of prices on cost and revenues

Figure 1 illustrates the development of indicators for the total costs and total revenues at current prices and 2005 prices, when the comparison is 2005. It is obvious that the indicators in current prices are subject to larger fluctuations. If we

consider fixed prices, then up to 2009, the growth rate has been higher costs compared to 2005. The year 2009 (year of global economic crisis and the year of unfavourable conditions for agriculture) is greatly influenced by the price development. While indicators in current prices compared to the base year recorded a significant decline, indicators at constant prices, while also falling, but costs are falling faster than revenues. In all the years, revenues or costs adjusted for price effects are lower than in the base year for comparison.

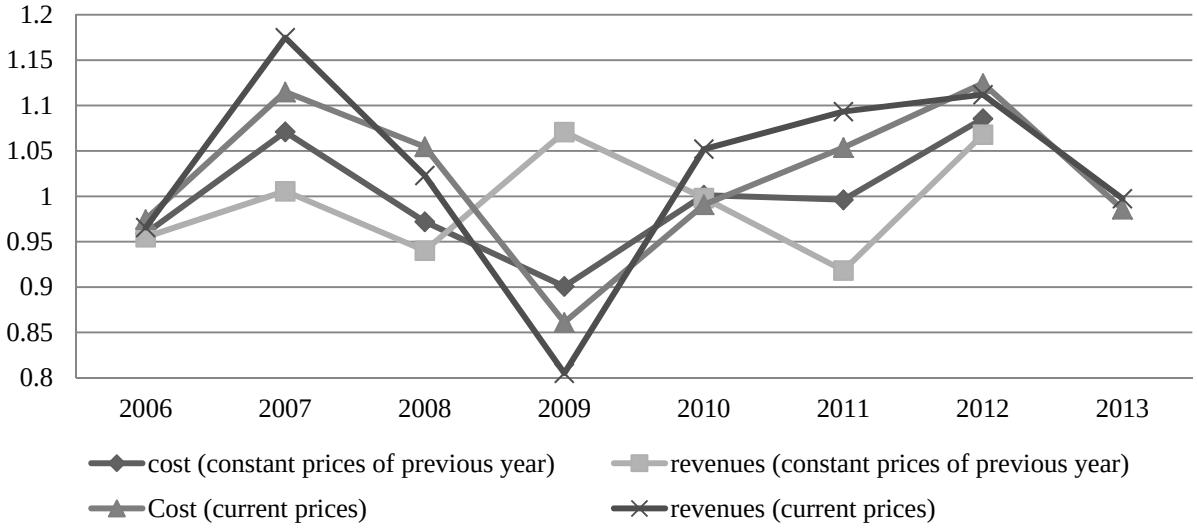
Figure 1 Basic indexes of cost and revenue at current price and at constant prices of 2005 (2005=100%)



Source: Own processing

Taking into account the annual changes (see Methods) is the development of revenues and costs denominated closer to reality. From Figure 2 it is clear that the growth rate of costs in all years except for 2009 is higher than the rate of revenue growth. In particular, in 2008, 2010 and 2011 costs increased compared to the previous year, while revenues in these years fall. It is expected that during this period the average farm net loss, which is confirmed in figure 3.

Figure 2 Chain indexes of cost and revenue in constant prices of previous year

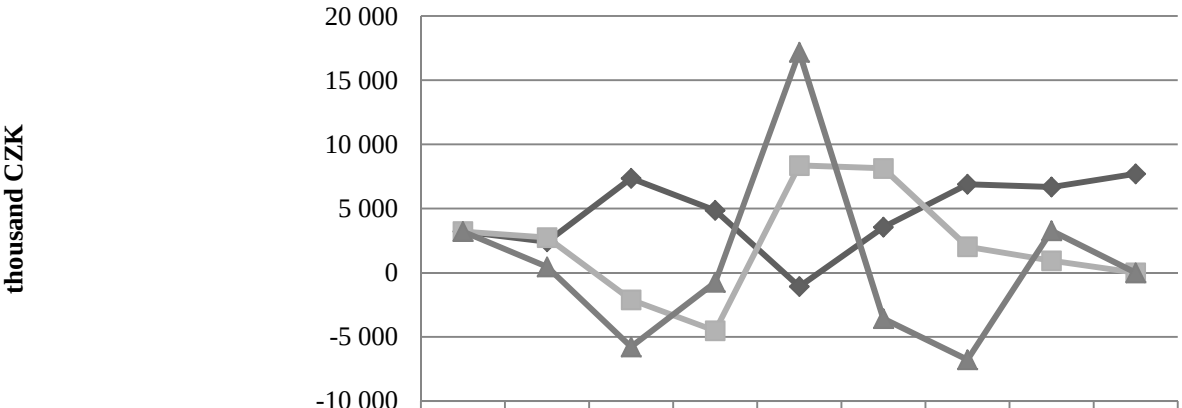


Source: Own processing

3.4 Impact of prices on profit/loss

The profit/loss is a summary and traditional indicator evaluating the effectiveness (profitability). In the agricultural sector there is its amount significantly affected by natural and climatic conditions affecting both crop and livestock production. The impact of price changes was included in profit or loss that result is presented in figure 3 in current prices, constant prices of 2005 and constant prices of previous year.

Figure 3 Profit/loss



	2005	2006	2007	2008	2009	2010	2011	2012	2013
current prices	3 214	2 414	7 356	4 856	-1 077	3 549	6 889	6 678	7 704
constant prices of 2005	3 214	2 746	-2 104	-4 519	8 353	8 128	2 025	936	0
constant prices of previous year	3 214	463	-5 771	- 744	17 176	-3 574	-6 777	3 275	0

Source: Own processing

Operating income, which is generated from the core business enterprises, should be ranging in positive terms - thus achieving a profit could fulfil a sense of their activities. Profit was achieved (with the exception of 2009) in all the monitored years. It cannot be said that the amount was clearly a growing trend. This is as already mentioned, partly due to climatic and natural conditions, and then due to the development of agricultural commodity prices - and not only Czech prices, but also worldwide.

Long-term loss (at about 1 million CZK) of profit from financial activities has not had so surprising trend (similarly in other sectors). It is due to paid interest expenses on loans. This is related to finance, especially investment activities as a result of under-funding of agricultural enterprises. Profit from extraordinary activities (at about 300 thousand CZK) consisted primarily of compensation costs as a result of extraordinary events – e.g. a compensation from insurance companies. Total gross profit or loss (the average value of about 3.5 miles CZK) was basically copying the operating profit, while its net value is about 500 thousand CZK lower due to taxes on income (Lososová & Svoboda, 2013).

Negative profit (loss) at current prices had the average farm only in 2009. If we take into account throughout the period of constant prices, and vice versa in 2009 average farm is profitable and in previous years (2007 and 2008) was at a loss. Negative result would be much more likely to reach the farm, if we calculated the revenues and costs in the prices of the previous period. From these calculations it can be deduced that the impact of price changes on the performance of the farmers is huge and agricultural producers must adapt their business development prices.

4 Conclusions

Revenues, respective costs of the farms are greatly influenced not only by climatic factors, but also the price development. The article aimed to determine the actual (real) development of these indicators, so that individual items of costs and revenues were deflated using appropriate price indices on the one hand to the constant prices of 2005 and the other hand in constant prices of the previous year. The actual amount of revenues and costs recalculated in the constant price of 2005 is unrealistic. Unreality grows as it moves away from the evaluation period chosen as the base period and thus growth rate become distorted. The recalculated values for the parameters in constant price of the previous period don´t deform growth rates and better see a change in the volume of monitored indicators.

Although in some years the prices of agricultural prices producers increased, it was not sufficient to ensure a higher volume of profit, because the rise in prices of individual cost elements were negatively influenced here except 2009. The opposite situation was in this year. The average farm realized loss in the current period but after conversion to the constant prices of the previous year would make a profit. This was was caused by a significant reduction in the prices of agricultural producers (0.75) although the volume of revenues increased (Figure 2).

All price indices indicate a negative development for farmers, as this represents an average annual decline in prices of agricultural producers (the most in 2009). Also average annual growth in supply of products and services to agriculture was higher than the growth rate of agricultural producer prices. This is followed by an average annual decline in terms of trade index.

Other authors (Serrano & Pinilla, 2003) analyses the evolution of the terms of trade for agricultural and food products in the second half of the 20th century. Authors conclude, from a long-term perspective, that the deterioration in the terms of trade for agricultural and food products was strong and clear in the second half of the last century.

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The Intensity of Agriculture Production of Organic Farms

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Abstract*: The content of the contribution is aimed to the evaluation of agriculture production intensity of the organic farms comparing to the one under conventional system of production. The analysis has been done using the agriculture production evaluation indicators in relationship to the total costs modified by the evaluation of unpaid labour force. These indicators were assessed in relation to the harvested area (for one hectare of the agriculture land) and to the volume of production (for one production unit). Moreover, the differences in the organic and conventional farming are evaluated under the different agro-ecological conditions locations (LFA, non-LFA). The conclusions indicate, that the organic farming is less material and labour consuming than the conventional one when evaluated for one hectare, however, more input consuming for one unit of production. These facts should be taken into the consideration when the agrarian policy measures having impact on the future organic farming development will be defined.*

Key words: Organic Agriculture · Intensity of Agriculture Production · Input Productivity

JEL Classification: Q15 · Q18 · Q12

1 Introduction

Organic agriculture is in the Czech Republic accepted agriculture system, supported by the government. In 2013 there were 4,060 of organic agriculture subjects (farms) with the total area of 11.7% of the agriculture land of the Czech Republic. The dynamic development of this agriculture system was enhanced by the legislation regarding the organic agriculture and in the crucial way by the financial support from the EU funds (Anderson & Swinnen, 2009) as well as Czech national sources. Next development of the financial support, its rational targeting and its amount requires deeper knowledge of the organic agriculture issue.

This article endeavours to contribute to the knowledge of the organic agriculture by presenting the results of the research aimed to the resource intensity of the organic agriculture compared to the conventional one.

2 Methods

The aim of the research work is to contribute to the deeper knowledge of the level and factors of the natural resources intensity of the organic agriculture. Regards to this aim and to the availability of the data the comparison of organic and conventional agriculture farms was chosen as a base of this research.

As a data source, the FADN CZ (Farm Accountancy Data Network of the Czech Republic) was used. This database is administered by the Institute of Agriculture Economics and Information (IAEI, Czech abbreviation = VÚZE) in Prague. (Hanibal, 2004) All the organic farms (OF) and conventional farms (CoF) were taken into account, which in 2012 counted 229 organic farms and 1,188 conventional farms. The data of 61 farm under either the transitional system from conventional to organic or using the both systems simultaneously. The indicators used in the research are based on the standard FADN EU methods. Because of the methodological requirements of the OF and CoF comparison the amount of total costs is modified by adding the valuation of the unpaid labour.

The comparison of the level and development of the agriculture production intensity and its factors is based on the decomposition of the time series 2001 – 2012 to the trend and residual components. For the trend modelling the second order polynomial was used based on the graphical analysis. In the tables the trend values for years 2001 and 2012 are presented (trend values), average annual growth (decline) in absolute number and correlation index. Correlation index is presented as a characteristic allowing the rough assessment of the annual fluctuations.

3 Research results

The productivity of agriculture is substantially involved by the production structure, mainly by the composition of harvested plants and breeded animals. In this connection it is necessary to point out the different production potential

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of crops and farm animals and its development and long-term favourable impact of agricultural systems with combined crop and animal production, mainly cattle breeding, on the soil fertility. Bečvářová, Grega & Vinohradský (1997), Bečvářová, Vinohradský & Zdráhal (1997).

Organic farming is generally regarded as a system of agriculture with lower intensity of production on one unit of agriculture area. However, the burden on the environment is in case of organic farming lower, compared to the conventional one as well as the decrease of the production intensity of non-renewable sources. The presented research follows these two aspects of agriculture production in the level and development of below mentioned characteristics:

$$i = n * e_n \tag{1}$$

where:
i the intensity of agriculture production for 1 hectare of agriculture land
n the sum of labour and material inputs for 1 hectare of agriculture land
e_n the productivity of labour and material inputs

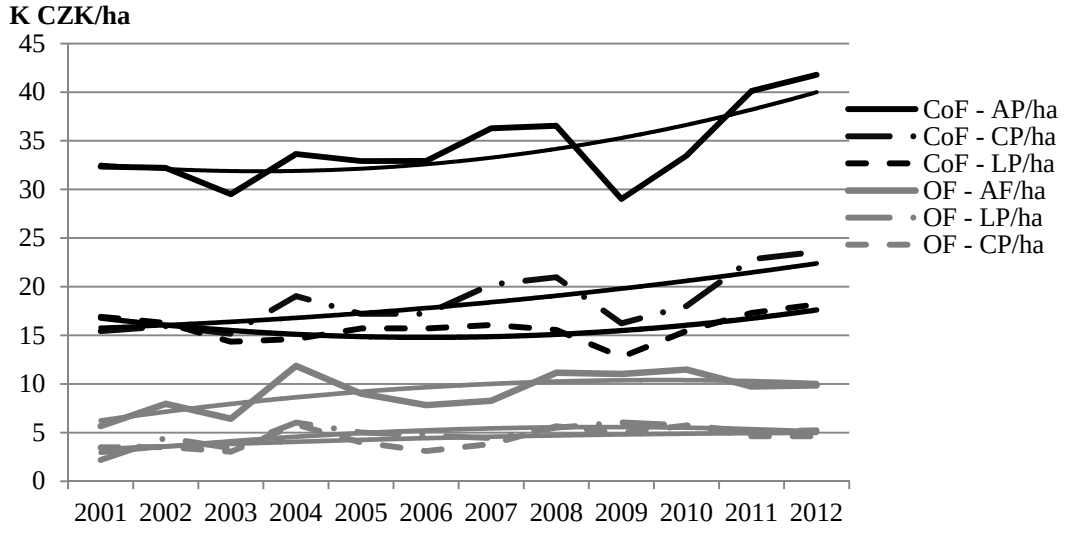
It is obvious, that production intensity could be involved by both: the volume of inputs for one unit of natural resources and the innovations leading to the productivity of these inputs. The effect of qualitative factors (demonstrated by an increase of "e_n") testifies about the higher intensification of agriculture, which corresponds to a greater extend the requirements of environmentally friendly and sustainable agriculture. (Turer & Doolitle, 1978; Chriar, 2000; Dietrich, 2010; Svobodová, Bečvářová & Vinohradský, 2011)

3.1 The level and development of the agriculture production intensity of organic and conventional agriculture enterprises between 2001 - 2012

The comparison of the level and development (AP/ha) presented in the Figure 1 and Table 1 demonstrates the quarter level on intensity in organic farm compared to the conventional farms. The values of the increases indicate the deepening of the difference.

The more significant annual deviations from the development tendency (mainly in 2008-2010) were caused especially by the price development on the agriculture market. This is documented by the development of the agriculture price index in given time series.

Figure 1 Agriculture, Crop and Livestock Production per 1 Hectare of Agriculture Land in Real Prices



Note: AP = agriculture production; CoF = Conventional Farms; CP = crop production ; LP = livestock production; OF = Organic Farms

Source: FADN CZ (2014), Own processing

The differences in the agriculture production intensity are obviously given by the above mentioned system of agriculture. Organic farming substantially limits the usage of fertilizers and other chemical means (means for crop and livestock protection).

Table 1 Agriculture, Crop and Livestock Production per 1 Hectare of Agriculture Land

		Number of Farms	AP/ha CZK	CP/ha CZK	LP/ha CZK	LP / AP %
OF	**2001**	38	6 245	3 320	2 925	46.84
	2012	229	10 089	4 975	5 115	50.70
	Δ	x	349	150	199	0.35
	correlation index	x	0.70	0.55	0.77	x
CoF	**2001**	1 166	32 545	15 775	16 770	51.53
	2012	1 188	40 001	22 390	17 611	44.03
	Δ	x	678	601	76	-0.68
	correlation index	x	0.71	0.77	0.64	x
OF/CoF 2012		x	0.25	0.22	0.29	x

Note: AP = agriculture production; CoF = Conventional Farms; CP = crop production ; LP = livestock production; OF = Organic Farms

Source: FADN CZ (2014), Own processing

The comparison of the agriculture production intensity level of chosen OF and CoF is involved by the prevailing location of OF into LFAs (Less-favoured Area). Of are oriented to the cattle breeding using the permanent grassland (see Table 2).

The comparison in marginal sets of farms located in LFA has shown that OF have in 2012 reached 30% of CoF level in agriculture production per hectare, 28% in crop production per hectare and 30% in livestock production per hectare.

The structure of agriculture production of OF as well as CoF in LFA is connected with higher share of livestock production, namely other cattle breeding. In case of CoF farming in relatively more favourable conditions outside the LFA record higher increase of crop production share on total agriculture production.

Table 2 Production Structure of Organic and Conventional Farms (Number of Farms)

		Cattle Breeding	Field Production	Garden-ing	Winery	Permanent Cultures	Milk Production	Swine Breeding and Poultry Farming	Mixed Production
OF	**2001**	24	4	0	0	0	2	0	8
	2012	154	8	2	5	8	20	0	32
CoF	**2001**	47	569	19	0	3	82	15	431
	2012	67	426	80	39	29	132	51	364

Source: FADN CZ (2014), Own processing

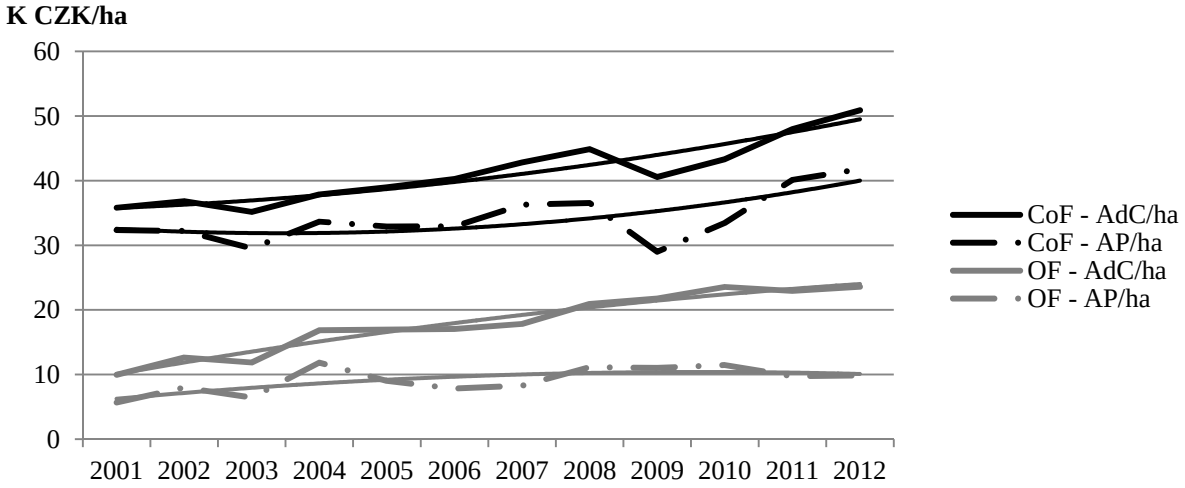
3.2 The Factors of Agriculture Production Intensity in Organic and Conventional Farms

The set of labour and material inputs for one hectare of agriculture land is presented in the form of adjusted costs for one hectare (see Figure 2 and Table 3). Based on the reached values, the inputs of OFs is half compared to CoF. The average annual increase was almost the same in case of OF and CoF. Figure 2 and Table 3 indicate the difference in the development of AP/ha (agriculture production per hectare) and AdC/ha (adjusted costs per hectare). This development is reflected in the level and development of labour and material inputs (indicator TP/AdC). OF have reached 57% of the CoF´s input productivity. The reciprocal value AdC/TP shows 1.96 CZK of costs for 1 CZK of production in case of OF, meanwhile CoF reach 1.12 CZK of costs for 1 CZK of production.

Base on the above stated data, OF spend half of inputs for one hectare compared to CoF however, they for one unit of production is the consumption of inputs higher by 75%.

The organic farming conception supposes the reduction or elimination of artificial fertilizers, pesticides and crops protection means as well as animal health protection means and nutrition supplements. It is supposed, that the reduction of these inputs should be replaced by the transition to the technologic methods more oriented to labour force usage. This should simultaneously lead to the increase of employment at the countryside.

Figure 2 The Agriculture Production Intensity, Inputs per one Hectare and Input Productivity in the Organic and Conventional Farming Systems



Note: AdC = adjusted costs (costs adjusted by the valuation of unpaid labour); AP = agriculture production;

Source: FADN CZ (2014), Own processing

However, the analysis of the state and development of employment and labour productivity does not confirm these assumptions. In 2012 the area accrued to year-round employed employee (AWU) 51.5 ha in OF and 33.44 ha in CoF (similarly see Hrabalová et al., 2013). The employment compared to the area of harvested land is, in case of CoF, almost double. Even more significant is the difference in labour productivity, where OF reach about 42% of CoF level.

Table 3 The Agriculture Production Intensity, Inputs and Productivity of Inputs

		Number of Farms	AP/ha CZK	AdC/ha CZK	TP/AdC CZK	ha/AWU	TP/AWU CZK
OF	**2001**	38	6 245	10 085	0.72	63.55	464 614
	2012	229	10 089	24 010	0.51	51.81	628 455
	Δ	x	349	1 266	-0.02	-1.07	14 894
	correl. index	x	0.70	0.98	x	0.74	x
CoF	**2001**	1 166	32 545	35 774	1.00	24.30	867 704
	2012	1 188	40 001	49 496	0.89	33.44	1 478 984
	Δ	x	678	1 247	-0.01	0.83	55 571
	correl. index	x	0.71	0.94	x	0.93	x
OP/CoP 2012		x	0.25	0.49	0.57	1.94	0.42

Note: AdC = adjusted costs (costs adjusted by the valuation of unpaid labour); AP = agriculture production; AWU = average working units; TP = total production; Δ = average increase

Source: FADN CZ (2014), Own processing

The above mentioned differences in the employment and labour productivity are connected mainly with different intensity of agriculture production and are correlated with the production focus of OF and CoF. As a main aspect could be regard the focus on cow suckler breeding on permanent grasslands with the lower number of animals for one hectare.

Table 4 The Energy Consumption per 1 Hectare and Unit of Production in 2012

		Number of Farms	Energy Consumption in CZK		TP/ha CZK
			per 1 hectare	per 1.000 CZK of production	
LFA	**OF**	200	2 469	212	11 669
	CoF	457	4 645	121	38 425
	OF/CoF	x	0.53	1.75	0.30
non LFA	**OF**	29	2 523	155	16 243
	CoF	731	5 185	99	52 579
	OF/CoF	x	0.48	1.57	0.31

Note: TP = total production

Source: FADN CZ (2014), Own processing

The organic farming differs from the conventional one by the concept of biotic technique and technology. Abiotic component of organic farming technique and technology is identical to the technique and technology of the agro-industrial systems. It means, that is based on the mechanisation using the non-renewable energy sources. However, pay attention to the available energy savings. Table 4 compares the energy consumption of OF and CoF in different agro-ecological conditions. OF consume the half of the energy for one hectare when located in LFA and non-LFA as well. However, measured in relation to one unit of production, OF consume about 75% more energy in LFA and 57% more in non-LFA.

4 Conclusions

In the last year of the researched period is the level of OF agriculture production intensity hardly third compared to the CoF. Based on the development tendency, this difference will be even more significant. OF spend just 50% of the inputs for one hectare compared to the CoF, however, consume about 75% more on production unit. The energy consumption of OF is about the same meaning.

Nowadays, when the share of organic farming is 11% of agriculture land of the Czech Republic, the future focusing of the agrarian policy should be considered in the relation to the future organic and conventional farming development. Above stated results regarding some circumstances connected to the supply-side of organic production market, are bringing the incentives for the evaluation of the agriculture production intensification factors. These should be assessed mainly with the respect to the material and energetic intensity for one production unit.

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Market Concentration as a Precondition for Higher Competitiveness of the Czech Food Industry

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Abstract*: The paper deals with the market concentration in the context of the development of market structure within the agribusiness commodity verticals. The aim of the paper is to evaluate the concentration on the Czech food processing market and to find the disparities among particular sectors of the food industry. Market concentration is calculated in the Czech food industry as a whole and within the particular food sectors. The general market concentration in the food industry in the period 2007-2012 grew. However, the number of companies, size structure of enterprises and the process of concentration are different in the particular food sectors in the Czech food industry. The concentration increased significantly in the sector of manufacture of vegetable and animal oils and fats and in the sector of manufacture of prepared animal feeds. The relatively high level of concentration is also in the sector of processing and preserving of fruit and vegetables, in the sector of manufacture of other food products and in the sector of manufacture of dairy products. Less concentrated sectors are manufacture of grain mill products and manufacture of bakery products, where there is a large number of very small enterprises of local significance. Increasing concentration in most sectors of the food industry can be considered as a prerequisite for higher competitiveness of the Czech food processors in relation to highly concentrated retail.*

Key words: Market Concentration · Food Industry · Market Structure · Competitiveness

JEL Classification: D47 · L11 · L66

1 Introduction

Changing market structures, increasing concentration of companies and increasing impact of large transnational chains on the character of markets can be considered as the most significant features of contemporary development also on the agro-food markets.

At present, the major players in the food market are multinational corporations. As reported by Daniels (2008), through contracts with food producers these corporations are also crucial in determining the nature and quality of the food supply. It is clear that the quality of food produced is determined by supermarkets and other transnational actors, often organized into large corporations, which currently can more simply succeed in the large competition, pricing policies and legislation regarding food quality and safety than small local producers.

With the entry of retail chains into the Czech market the structure of agribusiness has radically changed. Czech food processing enterprises, with regard to their weaker bargaining position with retail chains, were often forced to accept their disadvantage delivery terms and conditions including various fees for introduction of goods into the store, participation in the advertising or they had to suffer long maturity invoices. At the same time the food processors were under the strains on supply wholesale price and quality. On the other side the end consumer benefited from this situation with regard to lower price and variety of food.

Given the need to strengthen competitiveness the concentration is gradually increasing also in the Czech food industry. High concentration is reached in the sugar industry, in other fields of the Czech food industry the process is gradually under way (e.g. markedly in the dairy and bakery industry). Generally, the low concentration of the food producers makes the food industry to be less competitive. In contrast, the retail concentration is very dynamic. While CR_5 indicator in the Czech food industry in 2011 reached the value of 11.25%, concentration in the retail sector was more than four times higher – in 2011 CR_5 value was 45.5% (calculated on the basis of data published by Bisnode in the database Albertina). The lower level of concentration in the food industry means smaller volume of investment and consequently deepening disproportions in profits of manufacturer and trader and in overall market position (Blažková, 2014).

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2 Methods

Unambiguous assessment of the concentration is a complex task as explained by Curry and George (1983). According to Shughart II (in Henderson, 2007), industrial concentration refers to a structural characteristic of the business sector, that is the degree to which production in an industry (or in the economy as a whole) is dominated by a few large firms. Once assumed to be a symptom of "market failure", concentration is, for the most part, seen nowadays as an indicator of superior economic performance. Industrial concentration remains a matter of public policy concern even so.

Assessment of market concentration is contradictory from a business perspective and the perspective of the national economy. On the one hand, there are arguments that support the positive effects of higher concentration due to the distribution of fixed costs across a larger number of products, thanks to the repetition of certain activities and also due to a concentration of research, marketing and financial transactions and the use of managerial capacity. On the other hand, high market concentration usually means monopoly or dominant firm in the industry, which can be associated with market power. Large companies (e.g. transnational companies) have considerable bargaining power and ability to influence economic policy and the government's decision through corruption or social threat of unemployment, influencing public opinion, etc. (Adams & Brock, 1986; Dicken, 2011).

Brandow (1969) considers market power as one of the most elusive terms in economics. In his article he defines market power as "a firm's ability to affect directly other participants in the market or such market variables as prices and promotion practices". It is known that market power has many levels – from no market forces when the firm operates in a perfectly competitive market, to a large market power in the case of the monopoly firm with inelastic demand (or monopsony with inelastic supply). Moreover, the company may have little or no market power in one market, while in another market has significant market power – e.g. a firm processing fruits and vegetables may have significant market power when buying from farmers in certain areas, but very little market power in the sale of processed products customers, i.e. trade.

In this paper the problem of market concentration is discussed in the context of the development of market structure within the agribusiness commodity verticals, which has a significant influence on the development of relations and the price formation at different levels of the commodity verticals, as stated in Blažková (2008). The aim of the paper is to evaluate the concentration on the Czech food processing market, to find disparities among particular sectors of the food industry and to discuss the causes and consequences of the results obtained.

The analysis is based on the data published by the Czech Statistical Office, by the Ministry of Agriculture of the Czech Republic and the corporate database Albertina published by Bisnode. The analysed period is from 2007 to 2012. Common statistical methods (analysis, synthesis, comparison) were employed in the data processing. Markets are defined based on the 2- and 3-digit level of the Classification of Economic Activities (CZ-NACE). First, the share of the largest food processors in total production of the food industry is calculated (see Table 2), where as an indicator of output (production) the sales of own products and services are used. Within the 3-digit division the number of enterprises in particular sectors of the food industry is monitored and the size structure of enterprises in these sectors is analysed. Structure development is evaluated in terms of company's size, which is defined according to the number of persons employed. Companies are classified in four size groups – with 1-19, 20-49, 50-249 and 250 or more persons employed. Market concentration is expressed by the most common measure of concentration – the concentration ratio (the share of one largest firm and the four largest firms on the total sector production). The concentration ratio (CR_m) is calculated as the percentage of market share held by the *m* largest firms in an industry (Viscusi et al., 2005):

$$\mathrm{CR_m} = \sum_{i=1}^{m} \mathrm{S_i} \tag{1}$$

where:

S_i denotes the percentage of the *i*-th firm calculated as the production of the company divided by the sum of production of all firms in the market,

m denotes number of the largest firms for which the concentration ratio is calculated.

Market share is the percentage of a market accounted for by a specific entity (in this case it is calculated in terms of revenue, i.e. sales of own products and services). Calculations of the degree of concentration on the basis of individual company data may contribute to the explanation of the development of market concentration in the different sectors of the food industry, to the identification of differences in concentration across the commodity verticals and to the prediction of future changes in the markets´ structure.

3 Research results

Until 1989, the Czech Republic belonged to command economies – market structures on both the supply and the demand side were distorted, the prices were regulated, the currency was not convertible and foreign trade worked under a state monopoly. During economic reform after 1989 food processing companies were privatized, resp. restituted, which created opportunities for the development of small and medium-sized enterprises. Due to division of enterprises and emerging businesses, the number of food enterprises increased (according to the data published by the Czech Statistical Office, 217 state industrial enterprises operated in 1990 in the Czech food industry). The number of enterprises in the particular sectors of the Czech food industry in the resent years is shown is shown in Table 1.

Table 1 Number of enterprises in particular sectors of the Czech food industry

CZ-NACE		2007	2008	2008	2010	2011	2012
10.1	Production, processing, preserving of meat and meat products	1057	1062	1115	1347	1691	1594
10.2	Processing and preserving of fish and fish products	24	20	24	26	22	24
10.3	Processing and preserving of fruit and vegetables	216	196	185	196	162	146
10.4	Manufacture of vegetable and animal oils and fats	20	17	21	24	21	38
10.5	Manufacture of dairy products	188	178	186	229	199	233
10.6	Manufacture of grain mill products, starches and starch products	147	152	169	149	178	164
10.7	Manufacture of bakery and farinaceous products	2666	2662	2875	2479	2974	2576
10.8	Manufacture of other food products	992	1033	1198	1716	1442	1861
10.9	Manufacture of prepared animal feeds	249	262	309	393	410	513

Source: Panorama potravinářského průmyslu 2012 (Ministry of Agriculture of the Czech Republic), corporate database Albertina (Bisnode)

The general concentration in the food industry expressed by share of the four largest firms on the total food production in the period 2007-2012 grew, even with an increasing number of firms in the industry. The growth of concentration is confirmed also in the case of the share of the ten, resp. fifty or hundred, largest firms on the total food production. From the number of 7149 enterprises in the Czech food industry in 2012 one hundred largest companies contribute to the total food industry production more than 50% (56.9% in 2012), as seen in Table 2 showing the share of the largest enterprises on the total food production in the Czech Republic in 2007-2012.

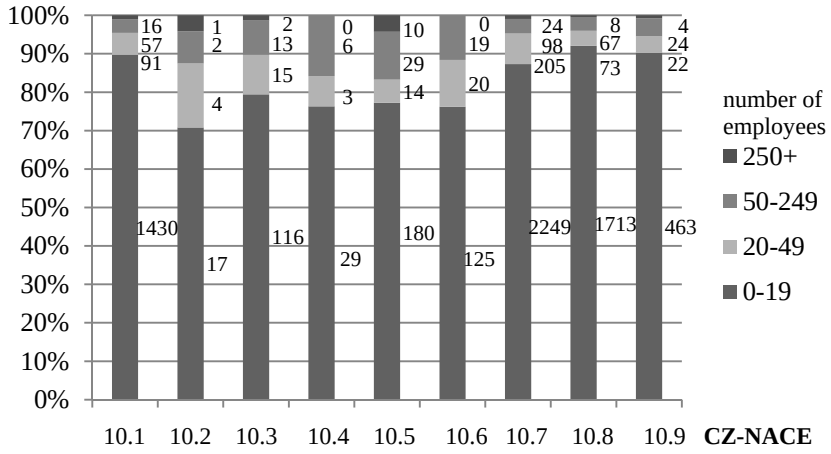
Table 2 Share of the largest enterprises on the total production in the Czech food industry in %

	2007	2008	2009	2010	2011	2012
Share of the 4 largest enterprises	8.4	8.6	10.0	10.3	10.4	11.5
Share of the 10 largest enterprises	14.5	15.9	18.1	20.1	20.4	21.4
Share of the 50 largest enterprises	25.1	28.6	33.1	40.3	43.5	45.9
Share of the 100 largest enterprises	33.2	37.6	42.5	50.0	54.0	56.9

Source: Own processing on the basis of the data published by the Ministry of Agriculture of the Czech Republic (Panorama potravinářského průmyslu 2012) and by Bisnode (corporate database Albertina)

The number of companies and size structure of enterprises in various sectors of the food industry is considerably different. The highest number of enterprises is in traditional food sectors such as meat processing, bakery production and in the production of other food products, which includes disparate subsectors such as the production of sugar, cocoa, chocolate, various spices, ready meals and other products. These sectors (10.1 and 10.7) have a large number of small private enterprises, which are targeting the local or regional market and for them there are crucial quality, product specialisation and difference. In contrast, the lowest number of enterprises is in the fish processing sector (10.2), which follows logically from the geographical position of Czech Republic. Size structure of food processing enterprises according to the number of employees in 2012 in the Czech Republic is shown in Figure 1.

Figure 1 Number of enterprises in the particular sectors of the Czech food industry



Source: Own processing on the basis of the data published by by Bisnode (corporate database Albertina)

Based on the analysis, we can conclude that the concentration process is different depending on the sector – the concentration ratios are presented in Table 3 and Table 4. The share of the largest enterprise on the total sector production increased significantly especially in the sector of 10.4, i.e. manufacture of vegetable and animal oils and fats (from 1.7% in 2007 to 66.8% in 2012) and 10.9, i.e. manufacture of prepared animal feeds (from 3.3% in 2007 to 23.3% in 2012), as shown in Table 3. Sector 10.4 is based on the production of crude and refined oils and fats (vegetable and animal except smelting and refining of lard and other animal fats), and is highly concentrated (the indicator CR_4 was 90.2% in 2012) – on the Czech market there are only a few large enterprises, as the largest companies there can be mentioned Preol, a.s. (a significant processor of oilseeds mainly for the production of rapeseed methyl ester), ADM Prague, s.r.o. (the largest supplier of edible vegetable oils in the Czech Republic) and since 2011 Usti Oils, s.r.o. (a manufacturer of edible vegetable oils). Feed production sector (10.9) includes manufacturing subsectors of livestock feed and fodder production for pets. In recent years, the proportion of compound feed for livestock decreased (which is a consequence of the development of the livestock), while the production of pet food increased significantly (in 2012 the share of the subsector of feed for pet animals on total sales of the sector was 43%, while, e.g. in 2007 it was only 14.1%). The largest company in the industry in terms of sales has been Hill's Pet Nutrition Manufacturing, s.r.o. since 2009 that produces food for pet animals – its share on the total sector sales is over 20% in the resent years (see Table 3). The largest producers of feed for livestock in the Czech Republic in terms of sales are Primagra, a.s., AFEED CZ, a.s., De Haus, a.s, ZZN Pelhřimov, a.s. and Cerea, a.s. The level of concentration in the sector is high – the indicator CR_4 was 42.6% in 2012.

Table 3 Share of the largest producer on the total production in the sectors of the Czech food industry – CR_1 in %

CZ-NACE	2007	2008	2009	2010	2011	2012
10.1	6.3	6.2	6.2	9.9	8.7	8.3
10.2	x	x	x	x	72.3	x
10.3	13.4	14.4	15.2	18.1	21.2	20.3
10.4	1.7	2.5	10.1	50.2	56.7	66.8
10.5	13.8	14.1	12.9	12.4	11.8	12.1
10.6	3.5	9.4	9.2	8.9	12.4	11.3
10.7	7.2	8.3	8.0	8.2	9.6	9.5
10.8	13.2	13.5	12.4	12.0	12.8	15.6
10.9	3.3	5.1	28.3	25.3	24.9	23.3

Source: Own processing on the basis of the data published by the Ministry of Agriculture of the Czech Republic (Panorama potravinářského průmyslu 2012) and by Bisnode (corporate database Albertina)

The relatively high level of concentration is in the sector 10.3, i.e. processing and preserving of fruit and vegetables, which is one of the less important sectors in terms of sales and employment – the share of sector revenues on the total revenues of the whole food industry in 2012 was only 2.5%. Number of enterprises processing fruits and vegetables dramatically decreased (from 216 in 2007 to 146 in 2012 as seen in Table 1). Weakening of this sector is mainly related

to the inflow of imports from countries with better environmental conditions. In addition the weakening position is caused also by increase in consumer demand for fresh fruit and vegetables, which are currently available on the market throughout the whole year. Improving the position of the sector may lie in the wider use of fruit and vegetables in the final food processing (such as delicatessen), in usage in gastronomy and substantial factor is also innovation of processed products. The largest manufacturer in terms of sales is the company Intersnack, a.s. (a producer of salty snacks such as chips, tortillas, crackers, etc.) which share on total sales of the sector 10.3 (CR_1) was 20.3% in 2012. The major fruit, resp. vegetables, processors are Beskyd Fryčovice, a.s., Hamé, s.r.o. and Fruta Podivín, a.s.

Table 4 Share of the four largest producers on the total production in the sectors of the Czech food industry – CR_4 in %

CZ-NACE	2007	2008	2009	2010	2011	2012
10.1	15.7	16.3	16.7	26.1	25.6	26.3
10.2	x	x	x	x	87.0	x
10.3	34.5	30.7	39.1	43.3	44.5	46.1
10.4	27.5	47.9	21.0	66.1	82.3	90.2
10.5	37.8	38.1	36.9	34.7	34.1	33.0
10.6	12.5	20.6	21.7	22.2	27.3	25.2
10.7	8.8	10.4	10.8	13.8	16.1	16.1
10.8	26.3	33.3	31.2	30.8	28.2	37.4
10.9	11.9	15.9	36.9	36.0	45.4	42.6

Source: Own processing on the basis of the data published by the Ministry of Agriculture of the Czech Republic (Panorama potravinářského průmyslu 2012) and by Bisnode (corporate database Albertina)

In the sector of dairy production (10.5), which is one of the key sectors of the Czech food industry, the process of concentration is under way. The indicator CR_4 is in the analysed period over 30%. The competitive environment is for milk processors in the Czech Republic highly challenging. A high proportion of dairy products is imported, although dairies in the Czech Republic are able to produce products of an adequate quality, i.e. the import does not mean just the enrichment the market with foreign specialties. In this case, the negative role is played by multinational retail chains which often prefer foreign suppliers – these retail chains seek production of low price levels and are little interested in production quality issues. It can be assumed that the concentration in this sector will grow, because highly concentrated enterprises are able to compete on a national and European market, while smaller dairies will be forced to focus on the regional markets or "niche markets" and to offer specific or regional dairy products, which can be sold e.g. on the farmers' markets or specialized stores. The largest producer of dairy products in terms of sales is the company Madeta, a.s., which share on total sales of the sector 10.5 (CR_1) was 12.1% in 2012. Other major companies are Olma, a.s., Mlékárna Pragolaktos, a.s., Danone, a.s. and Mlékárna Hlinsko, a.s.

The sector of meat processing (10.1) has been a sector with the largest share on the sales of the entire food industry for long time. The sector is not too concentrated – the CR_4 was 26.6% in 2012 and all large enterprises (with more than 250 employees) accounted for 43.7% of total industry sales in 2012. The structure of the sector is characterized by a large number of very small processors, which is documented in Figure 1. In relation to agriculture, the situation is worst in the pork processing, because processors do not require domestic raw material, but relatively inexpensive foreign raw material, where meat products are intended primarily to domestic market. The largest producers of meat products in terms of sales are Kostelecké uzeniny, a.s. and Vodňanská drůbež, a.s. (parts of the group Agrofert), Masokombinát Plzeň, s.r.o. and MP Krásno, a.s.

The high concentration of the sector 10.8, which includes a variety of manufacturing sub-sectors, is caused mainly by the situation on the sugar market – the total sugar production in the Czech Republic in 2012 was provided only by five sugar companies. The largest share on the sector sales has the company Tereos TTD, a.s. (manufacturer of sugar) – in 2012 the value of CR_1 was 15.6%. The share of the four major enterprises (Tereos TTD, a.s., Nestlé Česko, a.s., Moravskoslezské cukrovary, a.s. and Vitana, a.s.) on total sales of the sector was 37% in 2012. The trend of concentration in this sector is obvious – in 2007 the indicator CR_4 was 26.3%.

Sectors 10.6 and 10.7, i.e. manufacture of grain mill products, starches and starch products and manufacture of bakery and farinaceous products, belong traditionally among less concentrated sectors. Especially on the bakery market there is a large number of very small enterprises of local significance. Large enterprises with strong market position often include both bakery and mill production due to higher competitiveness of vertically integrated production. Companies with the largest market share are Penam, a.s. (bakery and mill production), Europasta SE (pasta production) and GoodMills Česko, a.s. (the largest milling group).

The sector 10.2 is the least significant food sector in the Czech Republic – the share of sector revenues on the revenues of the whole Czech food industry was only 0.6% in 2012. The data of this sector are mostly unavailable, because only small firms operate on this market and they are not legally obliged to publish their financial data. Another problem with the determination of concentration ratios is the fact that data available from the Ministry of Industry and Trade differ significantly from the corporate database Albertina.

4 Conclusions

Analysis has shown increasing concentration in most sectors of the food industry, which is a prerequisite for higher competitiveness of the food enterprises. Nevertheless, the concentration in the Czech food industry is still low in comparison with the subsequent vertical stage, i.e. trade (CR_5 was 11.25% in the Czech food industry in comparison with 45.5% in the Czech retail sector). In addition to the horizontal integration of enterprises, which results in higher concentration, the lack of competitiveness could be improved also by innovations and widening of product range according to the consumer demand, by greater vertical integration of actors within the particular verticals or by creating new distributional channels (short supply chains).

There is no doubt that the development of the structure of the food market affects also relations and the formation of price levels within commodity chains. The growing importance of the finalizing stages of the food commodity chain is also obvious from the declining share of agricultural prices on the final food prices (see Blažková, 2008). Therefore, this paper is considered to be a starting point for the further research – the causal link between the level of concentration in various sectors of the Czech food industry and the development of price margins and financial performance of processors in these sectors.

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A Survey Quality of Management Accounting in the Czech Companies

Miroslava Vlčková[1]

Abstract*: The article primarily deals with the analysis of using managerial accounting by companies in the Czech Republic. There are evaluated criteria that negatively affect the quality of management accounting. Based on the investigation is then examined the extent to which this criterion in the business exist, which area of managerial accounting cover and what methods are used. The research is focused on methods of conducting managerial accounting, methods of product costs, budgets, variance analysis methods, the influence of the conditions of production to manage management accounting and segmentation of the production process, value concepts of cost and other tools of management accounting. The survey is conducted on a sample of Czech firms. It is also analyzed the extent to which Czech companies use management accounting and what knowledge have managers of enterprises in this area. The purpose is to determine the level of knowledge of management accounting for business managers or employees of controlling and compare it with the knowledge of students on Economic Faculty, University of South Bohemia in the České Budejovice, branch of study accounting and financial management.*

Key words: Managerial Accounting · Criteria Quality of Accounting Data · Costs · T-test

JEL Classification: M41

1 Introduction

Under the previous surveys were determined fundamental criteria that affect data quality of management accounting based on AHP method. The most important criteria that negatively affect managerial accounting were showed (descending by the most important): Use only species classification of costs and revenues; non-use value and economic cost concepts; Compilation methods of calculations; Methods and frequency evaluation of variances; The high degree of subjectivity, incorrect presentation of accounting data; The failure to use performance depreciation; Methods of transmission of information and the time shift; Absence second management circuit; Methods of budgeting; Determination of external information and information relating to the activities, operations and processes; Focusing only on the liability or only on performance; Human resources in management accounting; The influence of the production conditions, segmentation of production process (Vlčková, 2014). This research article follows. The aim is to analyze to what extent each criteria occur in the Czech enterprises and what knowledge of management accounting managers and workers controlling have. It was also determined hypothesis that managers do not have adequate knowledge potential in management accounting.

2 Methods

Managerial accounting is an area of accounting that provides information for managers in the company. It is a process of identification, measurement, collection and analysis of documents. It should help managers fulfill set targets. (Horngren, Sundem & Stratton, 2005). Managerial accounting is used for a specific company, either as a financial measure or instrument of control (Duska, Duska & Ragatz, 2011). Managerial accounting is accounting, which is conducted on a voluntary basis for internal needs of company and whose main objective is submission critical information for decision-making with a focus on efficiency. Compared to financial accounting is not limited - its rules and procedures are determined by management (Jiambalvo, 2009). The partial objective is to collect information in relation to the management of costs and revenues for each center, or ongoing processes or activities in the enterprise.

Information of management accounting and financial accounting is therefore different to detail and frequency of data evaluation, and the difference of content and objectives of the concept of assets, costs and revenues and profit. In managerial accounting as opposed to financial accounting can be viewed also facts that are difficult measurable (Fibírová, Šoljaková & Wagner, 2007). Data of management accounting and their analysis are primarily based on cost. To get the quality of accounting data is therefore necessary to divide these costs, depending on what decision tasks will need managers. This classification subsequently affects the whole concept of cost or management accounting. The basis of costs classification are the purposes for which type of cost are. Individual point of view is derived from the needs of management, in particular the determination of cost task and its control. According Janout & Schroll (1997), Drury (2012) and Král (2010) the cost can be divided by type or purpose structure, which could be subdivided more in detail.

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Calculation is a fundamental tool for cost management with a focus on performance. The importance lies mainly on the fact that shows the unit expressed output and financial characteristics and it allows influence the level and structure of product costs and thus the earnings of the company (Landa, 2006). The aim of the costing system in the narrower sense is the management of economy, primarily unit costs, or other variable costs (Král, 2010). Budgets of internal departments are focused on measurable performance of departments on the one side, and on measurable costs on the other side, on influenced supplies or on bound capital. They require resolution to unit costs and overheads. Budgets of unit costs are taken from the calculations of cost per unit, respectively based on technical standards for cost and performance. The main interest is focused on the budgets of overhead costs (Drury, 2012). In the context of financial management, control of budget occupies an important place. It consists in the comparison of budgeted and actual values achieved It is important for firms to establish control standards and have adequate management of accounting and financial evidence. The essence of control is a quantification of any differences and especially the analysis and interpretation of the incurred variances. The solutions are two basic issues: the cause of the variances and responsibility for the incurred variances.

High quality information is not easily available. Stiglitz (2001) says that asymmetric information can be found in all areas. In the field of management accounting, it can be most often the concealment of information or misinterpretation of results.

3 Research results

On the basis of these criteria was drawn up a questionnaire whose objective was to determine whether the criteria occur in Czech enterprises and to what extent, that Czech companies use managerial accounting for its management and to what extent. The survey focused on companies that have implemented management accounting The operational objective was to demonstrate how are held the accounts, the methods used by companies and how deep is the knowledge base of managers or controlling workers in the field of management accounting.

The questionnaire was addressed to managers and executives workers in controlling, or in accounting department of the company if the company does not have a controlling department. It was purposefully distributed to enterprises, which have special characteristics - Czech enterprises, legal form of business is a limited liability company or joint stock company, number of employees from 10 to 1999, the annual turnover from 10 mil. to 1000 mil. CZK and principal activity by CZ-NACE section C – Manufacturing industry).

The questionnaire was tested in the first part on the pilot research carried out on twelve companies, which purpose was to discover any inaccuracies in the asked questions, their structure or offered answers. Subsequently, the questionnaire was modified about identify deficiencies and distributed to respondents.

3.1 The survey in management accounting

The questionnaire survey was attended by 294 companies from twelve regions of the Czech Republic, and it was contacted 1,123 enterprises. The majority of the companies participated in the survey, is located in the South Bohemian Region and it was almost 59%. Compared to other regions of the South Bohemian Region are businesses represented to a degree that it cannot evaluate the existence of regional differences.

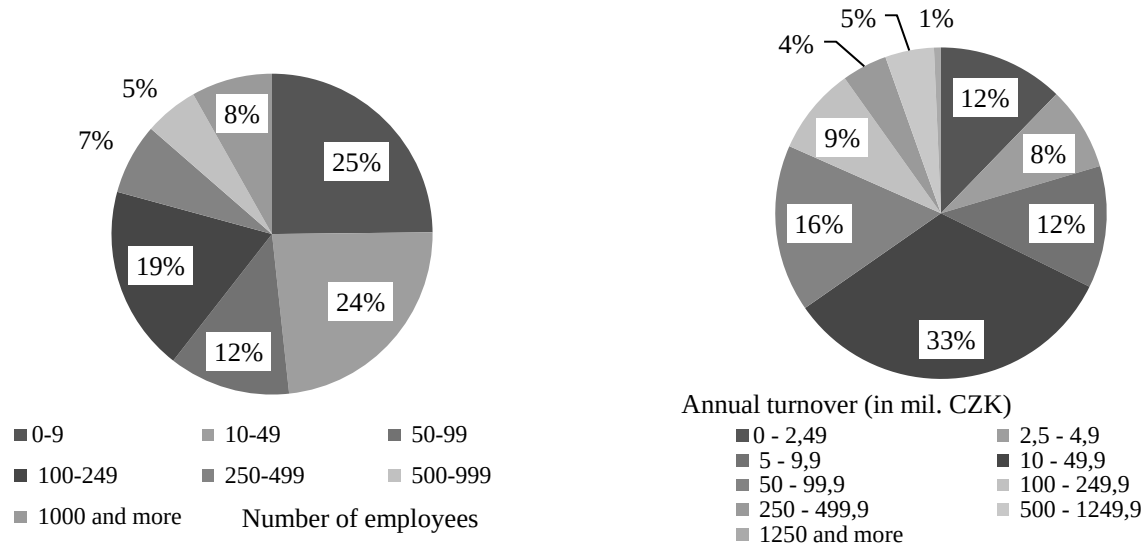
As part of basic characteristics of surveyed enterprises were also detected the number of employees and annual turnover of companies. Figure 1 shows the results.

The graph (figure 1) shows that almost half of respondents said the number of employees to 49 and 33% of respondents have turnover from 10 to 50 mil. CZK Managerial accounting is voluntary for businesses, they have it implemented to their needs and management decision making. It was found that from 294 respondents, keep managerial accounting 76 companies (25.85% of respondents), and all respondents keep it only in a simplified range with the help of analytical accounts in financial accounting. No respondent indicated that managerial accounting keep by dual accounting system.

The most frequently occurring reasons for the absence managerial accounting indicated by businesses who do not have it implemented, were for example:

- it is not necessary for management or bookkeeping,
- excessive requirements on management,
- expensive initial investment for purchase the software,
- additional labor and labor costs and other expenses,
- lack of knowledge,
- it is not necessary by the legislation …

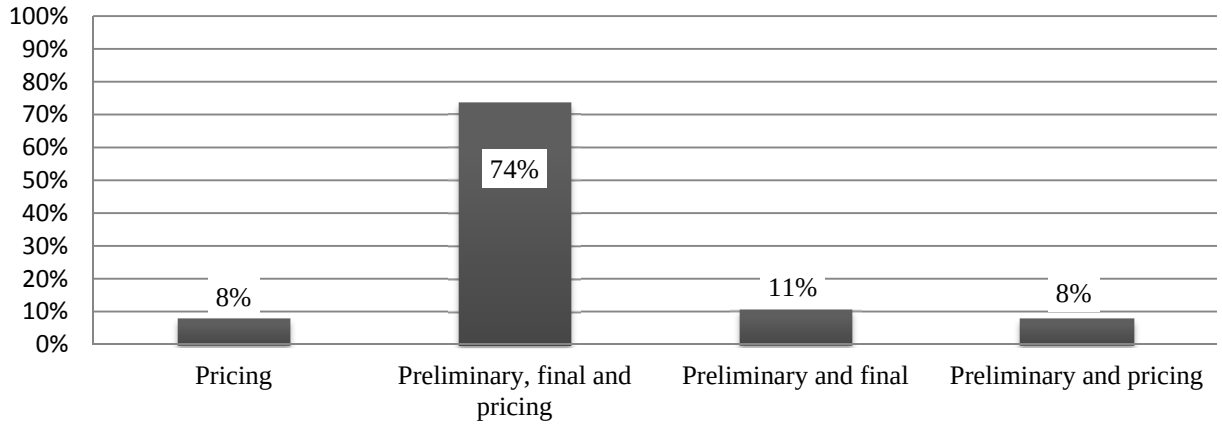
Figure 1 The number of employees and annual turnover



Source: Own processing

Another part of the survey focused only on companies that keep management accounting. The next question was directed to the orientation of management accounting. More than 88% of respondents focused on performance or on performance and responsibility at the same time. Only about 12% of the respondents focused only on responsibility and 35% of respondents only on performance. Other questions concerned to the methodology of reported data in managerial accounting. As regards the type of product costs, no respondent indicated that compiles only preliminary calculations or only the final calculations. Most respondents indicated that compiles preliminary, final and pricing calculations together. Exact values are shown in the following figure.

Figure 2 Types of calculations

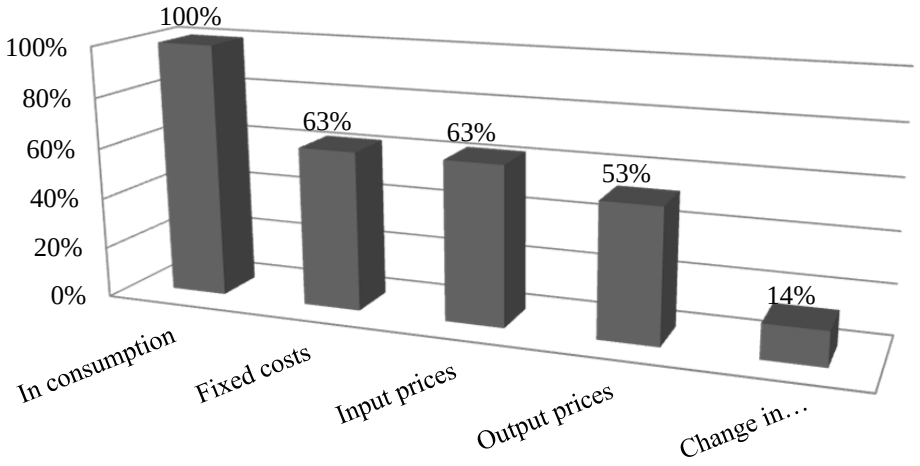


Source: Own processing

Further questions related to variances. Weekly evaluate variances 9% of companies, 51% monthly and quarterly 14% of enterprises. No company evaluated variances only once a year. But 26 % respondents do not evaluate variances. Types of variances in the companies and their ratios are shown in Figure 2. Deviations are evaluated only at 57 companies.

On the question whether companies use performance depreciation responded “yes” nearly 37% of respondents. Much worse results were found on the question if companies use economic or value costs conception. Here responded positively only more than 14% of respondents.

Figure 3 Type of variances



Source: Own processing

On the question whether companies divide costs into variable and fixed costs positively responded almost 37% and on the question whether companies divide costs into direct and indirect costs responded positively more than 97% respondents. According to modern technical and scientific literature classification costs into direct and indirect recedes into the background and still more costs divide by other aspects. According to the survey, this theory has not been confirmed and it was found that the vast majority of businesses still prefer classification of costs into direct and indirect. The survey also shows that more than a third of businesses use classification on direct and indirect costs, as well as on classification of fixed and variable costs

On the question whether on method of keeping management accounting affects the character of the business and diversity of the production process, more than half of the respondents answered "probably yes" (58%). “Yes” answered 10% of respondents “rather not” 29% and “no” 3% of respondents.

3.2 Determination of knowledge

The last 10 questions focused on knowledge. The purpose was to determine what level of knowledge regarding the theory of management accounting, have business managers or employees in controlling. It was chosen medium difficult questions that students of the course of managerial accounting at the Faculty of Economics should know. Questions were generated by e-learning test program specially designed for teaching managerial accounting by author of this article. At the same time, this test was given also to 53 students Faculty of Economics, University of South Bohemia in the Czech Budejovice, who attended the course of managerial accounting and subsequently these two groups of respondents were analyzed and evaluated on the basis of statistical methods t test in program STATISTICA 12.

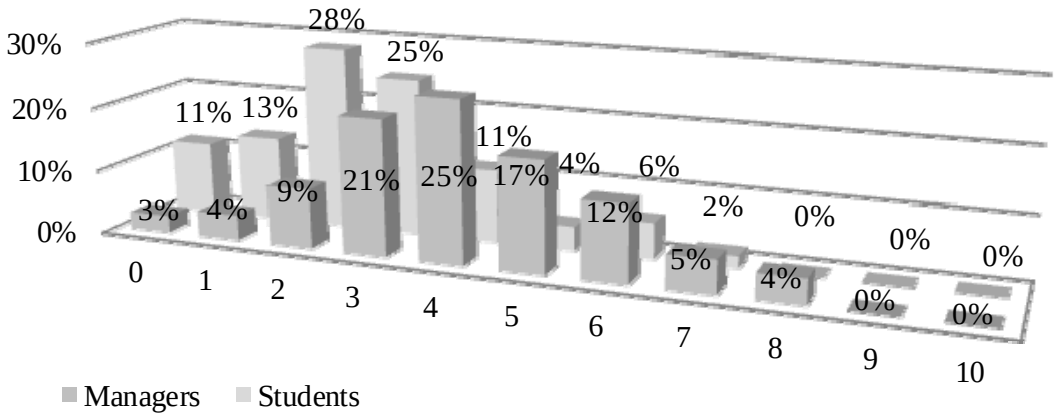
The results were very disturbing. It was found that more than 63% of respondents in the evaluation of the test within examination of managerial accounting would not succeed (success rate is given 70%, so the number of errors should be from 0 to 3). Detailed results are reported in the following table and graph.

Table 1 Number of mistakes

Number of mistakes	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Managers	2	3	7	16	19	13	9	4	3	0	0
Students	6	7	15	13	6	2	3	1	0	0	0

Source: Own processing

Figure 4 Number of mistakes



Source: Own processing

The results of t-test were clear - managers and workers in controlling do not have adequate knowledge about the management accounting in comparison with students. The average number of mistakes was 4.11 mistake to one manager and 2.55 mistakes to one students. Other results are shown in the table 2.

By this t-test (table 2) was confirmed hypothesis.

Table 2 Results of T-test

Average number of errors - managers	**Average number of errors - students**	**t**	**Degrees of freedom**	**Number of managers**	**Number of students**
4.1053	2.5472	5.0447	127	76	53
p	**Standard deviation managers**	**Standard deviation students**	**F (Range)**	**p (Range)**	
0.000002	1.7707	1.6591	1.1391	0.6236	

Source: Own processing

4 Conclusions

The aim of the present paper was to determine to what extent the criteria affecting the quality of management accounting exist in Czech enterprises and what knowledge managers and executives workers in controlling have in the field of managerial accounting. Questions were focused on a keeping management accounting, the methods and principles in business at its use. It was found that within the analyzed group of companies have introduced management accounting only a quarter of businesses.

In addition, the used methods are in many cases only the basic, the simplest. Many companies have introduced a managerial accounting only according to their needs. At the end, the questionnaire included a knowledge test. The purpose was to determine the level of knowledge of management accounting for business managers or employees in controlling and compare it with the knowledge of students on Faculty of Economics, University of South Bohemia in the České Budejovice. The results of both groups of respondents were statistically analyzed (t-test). It was found that the knowledge level of managers at significantly lower than students levels.

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Possibilities of Identifying Manipulated Financial Statements

Zita Drábková[1]

Abstract*: The paper deals with the possibilities of using different techniques and tools to identify potential risks of manipulated financial statements beyond true and fair view of accounting. Current research has verified the hypotheses of identifying the risks of financial statement manipulation in a case study of five accounting periods using the CFEBT model within the Czech Accounting Standards for different options of using creative accounting methods. Furthermore, the results CFEBT models in each case study are compared with results of the Beneish mode. The model of CFEBT confirmed positive results of the Beneish model for the used technique of windows dressing in terms of the Czech Accounting Standards.*

The following paper further analyzes and evaluates techniques and tools to identify risks of manipulated financial statements using the most important methods of creative accounting and accounting fraud in the CFEBT mode, the Beneish model, the Jones model of Nondiscretionary Accruals in comparison with the results of the Altman's model of financial health.

Key words: Fair and true view · Creative accounting · Fraud · Detection of financial statements manipulation

JEL Classification: M4 · M1 · G3

1 Introduction

The Financial Statements are an important source of information for users of financial statements i.e. the owners, Corporate Governance, potential investors, state, creditors, customers, suppliers and the public. They have to faithfully and honestly inform about the financial status of the entity on its performance, structure, property, resources, funding and equity capital structure.

If the entity significantly distorts the financial statements or gives false information and this disrupts a true and fair view of accounting it will be affected by legislative sanctions in accordance with the Accounting Act, but also it could be prosecuted by criminal law as the offense of misrepresentation of data on the state of management. Therefore, it is important for the users of the financial statements to have the opportunity to evaluate the risk of handling accounting and they should have the tools to evaluate this risk.

This paper should therefore extend current knowledge, information and methods in this area and offer some alternative solutions.

2 Methods

National studies from around the world such as (Amat & Blake, 2006; Brennan & McGrath, 2007) and (Jones, 2011) or Global Economic Crime Survey of the PwC major auditing company in 2014 (PwC, 2014) confirms the growing pressure in promoting transparency and ethical business, not only in publicly traded business corporations, but also in the misuse of subsidies by major business corporations and the use of accounting as evidence. In Jones´s book called Creative Accounting, Fraud and International Accounting Scandals some of the creative accounting tools are described. Those tools are able to influence overall values in the financial statements for different strategies such as increase income, decrease expences, increase assets and decrease liabilities (Jones, 2011).

Chartered Institute of Management Accountants published a guidebook of risk management where the importance of issuing a plan of reactions after a fraud is detected and fraud prevention is highlighted. The guidebook also lists risk areas of fraud, its definition followed by case studies in reporting fraud (CIMA, 2009).

Prevention and detection of accounting fraud is also engaged in Dave Tate´s publication. Tate lists typical operation, through which accounting fraud can be committed in 15 major risk areas such as liabilities, expenses, assets of increase, cost of goods sold, equity (Tate, 2011).

Pamela S. Manton in the book called Using Analytics to Detect Possible Fraud provides case studies of four companies. The financial statements of the selected companies subjected examination of via the individual tools and techniques appointed to examine the accounting fraud. These case studies include the following techniques: Liquidity ratios,

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profitability ratios, horizontal analysis, vertical analysis, cash realized form operations, analyzing cash realized from operations to net income from operations, the Beneish M-Score model, Dechow-Dichev Accrual Quality, Sloan´s Accruals, Jones Non discretionary Accruals, The Piotroski F-Score model, Lev-Thiagarajan´s 12 Signals, Benford´s Law, Z-score analysis, Correlation, Regressions analysis (Mantone, 2013).

The paper uses the Jones model to test the risks of manipulated financial statements, within the results of the above case studies of creative accounting in variants A and C, designed by Dr. Jennifer Jones. The model is based on measurement of discretionary spending of the next periods. She is convinced that discretionary accruals provide more space for manipulation compared to non-discretionary accruals as they are equal to zero within the period. Discretionary accruals can be classified as expenditure which although recorded in books are not mandatory, as the resulting costs to the remuneration of management, warranty reserves and asset provisions for bad assets. As a part of her research, Jones studied the influence of management on reducing income (Manton, 2013).

Previous research verified the hypothesis of a relation between a loss and an increase in cash flow in the period of five years i.e. whether the sum of their value in five years with minor variations lead to a similar result. After that the CFEBT model was designed and tested to identify possible risks of manipulated financial statements in case studies of creative accounting for the conditions of Czech Accounting Standards (Drábková, 2013).

Furthermore, data from the case studies already published in the Beneish Model were assessed and verified for the conditions of the Czech accounting Standards. The Beneish M score was created for financial conditions by Professor Daniel Beneish Messod at Indiana University in Bloomington, USA (Beneish, 2001).

The paper analyzes and evaluates the techniques and tools to identify risks of manipulated financial statements using the main methods of creative accounting and accounting fraud in the CFEBT model, Beneish model, the Jones model of non-discretionary accruals in comparison with the results of Altman's model of financial health. The analysis is based on a case study of an entity in five accounting period for option A (presents selected key techniques of creative accounting, windows dressing and accounting fraud) and option C (accounting presents maximization of displaying a true and fair view in accounting), for further details see the case study in (Drábková, 2013).

3 Research results

For the purpose of verifying the identification model CFEBT a case study was designed for the business entity (wholesale) in options "A" and "C". The entity model "A" at the same conditions applied the techniques of creative accounting (windows dressing) to monitor turnover and maximize asset value. Option “C” monitors in compliance with the goal of true and fair view as much as possible.

3.1 The Beneish M-Score Model

Beneish Model is a mathematical model used for financial models. It contains eight variables that can detect manipulation of accounting data. This was based on statements, calculating the M score. M-score was created by Professor Beneish-Messod. In many respects, it resembles the Altman Z score, but is optimized for the detection of profit manipulation more than bankruptcy.

M-score calculation (8-variable model):

$$M = -4.84 + 0.92*DSRI + 0.528*GMI + 0.404*AQI + 0.892*SGI + 0.115*DEPI - 0.172*SGAI + 4.679*TATA - 0.327*LVGI \quad (1)$$

The following variables are employed:

1.DSRI - Days' sales in receivable index in the t and t-1 period.

2. GMI - Gross margin index as the ratio of gross margin and sales in the t and t-1.

3.AQI - Asset quality index.

4. SGI - Sales growth index.

5. DEPI - Depreciation index.

6. SGAI - Sales and general and administrative expenses index.

7. LVGI - Leverage index of total debts to total assets in the t and t-1.

8. TATA - Total accruals to total assets in the t-period.

M-score of less than -2.22 indicates that a company do not manipulate the financial statements in the accounting period. M-score greater than -2.22 signals that the company will likely be a manipulator.

Beneish Model represents a different perspective on the manipulation of accounting data. When an entity reaches the M-score higher than -2.22, calculated from the above eight variables, the model assumes that it is probable that the entity has manipulated accounting data for the accounting period or is strongly motivated to manipulate accounting data (Beneish, 2001).

Table 1 Beneish M-Score Model in the 1st and 2nd year

Options for 1st - 2nd year	M-Score	Result
Option A	-0.83	High risk in 1st year
Option C	-2.26	Low risk in 1st year

Source: author

Table 1 revealed that option A´s value of the Beneish M-Score amounted to -0.83 thus was higher than -2.2, which is set by to model to the risk assessment. M-Score for A option and year 1 (accounting period) thus positively detects high risk of manipulation of financial statements. In contrast, C variant and 1.y of Beneish model reported low risk of manipulation of financial statements. The M-score of -2.26 is less than the threshold value of -2.2. The M-Score positively detects methods of the creative accounting (windows dressing and fraud) that distort the true and fair view of accounting in option A case study.

3.2 The CFEBT model

The *CFEBT* model is defined as follows (Drabkova, 2013):

$$CFEBT = \sum_{t=1}^{5} \left| \frac{CF_t - VH_t}{VH_t} \right| \tag{2}$$

If $CFEBT \geq materiality$, there is a high risk of breaching a true and fair view of the accounts.

Materiality, significance ranges between 5 and 10%, taking into account the individual circumstances of the entity, as it did during the audit of financial statements by an external auditor.

Materiality of 5% is considered in this paper.

Table 2 CFEBT model in the 1st - 5th year

Options for 1st - 2nd year	Materiality	Result of risk manipulated financial statements
Option A	37.5%	high risk
Option C	2.5%	low risk

Source: author

The CFEBT model follows five financial years of the development of increase (decrease) in cash flow and profit development, which results from the accrual basis of accounting. According to the above table, the result of the CFEBT model for A option reported a deviation value at the time high above the levels of significance (materiality) of 37.5%. In this option the model detected a high risk of manipulation of financial statements and recommends analyzing the differences in risk items of the statements. In comparison with the result of C option, the results of the CFEBT model showed the value of 2.5% that is not considered significant in relation to risk of accounting fraud detection.

3.3 Jones Nondiscretionary Accruals

The formula of total Nondiscretionary Accruals is as follows (Mantone, 2013):

Jones´s analysis provide information on using time resolution as considered by an accounting unit. Using the model allows users to assess of accounting information in the financial records has been possibly manipulated. If the non-discretionary accruals compared to total assets are lower in a period with a comparison to other periods than the model reveals that discretionary expenditures of the following periods are higher. Such situation may suggest possible manipulation.

$$\left(\frac{1}{\text{TA}}\right)+\left(\frac{\text{Revenue}_{\text{current year}} - \text{Revenue}_{prior\ year}}{\text{Total assets}_{\text{current year}}}\right)+\left(\frac{\text{Property,plant, equipment}_{\text{current year}}}{\text{Total assets}_{\text{prior year}}}\right) \tag{3}$$

This model calculates nondiscretionary accruals and suggests that as nondiscretionary accruals decrease, discretionary accruals increase. Sloan´s Accruals analyzes if the accruals significantly influences net income for the same year.

Table 3 Jones Nondiscretionary Accruals, option A

Accounting item	1st year	2nd year	3rd year	4th year	5th year
Total assets	65005	118105	53244	77619	31713
Revenue	79500	80605	7740	39875	40094
Property, plant, equipment	11100	12100	12100	13600	13600
Jones Accruals	x	0.195510993	-1.26605133	0.66945608	0.1821334
Result	x	x	**high risk**	**high risk**	**high risk**

Source: Own processing

Table 4 Jones Non discretionary Accruals, option C

Accounting item	1st year	2nd year	3rd year	4th year	5th year
Total assets	15655	19505	26394	25019	26673
Revenue	31250	31355	31490	15125	16094
Property, plant, equipment	10000	11000	11000	11000	11000
Jones Accruals	x	0.708098023	0.569124027	-0.23730361	0.476034695
Result	x	x	low risk	**high risk**	low risk

Source: Author

Tables 3 and 4 revealed the stability of non-discretionary items between accounting periods for both A and C options. Option A reported fluctuation of non-discretionary accruals from the second to the fifth year of the period. In the third year, the non-discretionary items decreased significantly which was followed by a significant increase in discretionary items in the following fourth year. In such case, the model detects a possible manipulation with profit during each accounting period.

Option C reported quite invariable values of non-discretionary items in the second, third and fifth year (accounting period) together with a significant decrease of non-discretionary items in the fourth year. The decrease can indicate earning manipulation, possibly the method of income smoothing or accounting fraud.

As the Czech accounting standards within cost and revenues do not strictly record the principle of the content taking precedence over the form, this information can be seen as complementary in terms of Czech accounting standards particularly for understanding underlying accounting data and processes of management accounting by the managers of Corporate Governance in the extended concept to refine the calculation of deferred taxes based on the economic substance of financial data.

3.4 Altman Z-Score Model

Professor E.I. Altman designed a model in 1968. The aim of the model is to determine business subjects that are likely to bankrupt from those that are out of such risk. For non-marketable businesses the following modification of the Altman model could be employed (Bláha & Jindřichovská, 2013):

$$Z\text{-}score = 0.717*x1 + 0.847*x2 + 3.107*x3 + 0.420*x4 + 0.998*x5 \quad (4)$$

where:
x1 = Net working capital / total assets
x2 = retained earnings / total assets
x3 = EBIT/ total assets
x4 = capital / total debts
x5 = sales / total assets

Retained earnings = funds created from profit + profit / loss of previous periods + profit/loss of the current accounting period.

The following applies for the resulting Z-score: if it is larger than 2.90 the business is financially firm or stable – it predicts a good financial situation, if the score is from 1.2 to 2.9 it is the grey zone, when the value of Z-score is less than 1.2 a business is at risk of bankruptcy in the future. .

Table 5 Altman Z-Score Model, option A in the 1st - 5th year

Accounting periods	Z-Score	Financial health assesment
1st year	1.7	Grey zone
2nd year	1.4	Grey zone
3rd year	1.2	Grey zone
4th year	1.0	at risk of bankruptcy
5th year	>2.9	good financial situation

Source: Author

Table 5 for option A s using the method of windows dressing and fraud reported the financial health of the grey zone in year 1, 2 and 3.

In the 4th year, the Z-Score reported bankruptcy risk, followed by a good financial situation in the very next of the accounting period according to the resulting Z-score of > 2.9. Here Altman's model does not provide users of financial statements with a useful tool for determining the relevant financial health. For the purposes of risk assessment of manipulated financial statements it can be identified significant risk of manipulation with the financial statements in each year. .

Table 6 Altman Z-Score Model, option C in the 1st - 5th year

Accounting periods	Z-Score	Financial health assesment
1st year	2.9	Grey Zone
2nd year	3.2	good financial situation
3rd year	2.9	Grey Zone
4th year	>2.9	good financial situation
5th year	>2.9	good financial situation

Source: author

Table 6 revealed that the Altman Z-Score for option C recorded business corporations in the grey zone in the 1st and 3rd year of evaluation while for these two years the value of the Z-Score amounted the threshold of 2.9, as the Z- score above the threshold indicates good financial health of a business corporation. In subsequent years (the 2nd, 4th and 5th year), the Z-Score reported financial health above the threshold of 2.9.

The positive outcome of the assessment of financial health is significantly affected by the proposed business corporation that is not burdened by obligations that would threaten the business activity of the corporation.

For the purposes of risk assessment manipulation of financial statements in individual years the results of the Z-Score for each accounting period can used. Stable and positive results of the Z-Score indirectly confirm the results of other models detecting manipulated financial statements. At a general level, the question is whether the stability of the results of this model is to some extent caused by the manipulation of accounting items of assets, liabilities, income, on which the model is based.

4 Conclusions

A true and fair view of the different accounting systems is not comparable data for the users of financial statements but within the national accounting system financial statements of the entity in the comparison of different accounting periods should provide the user with comparable data and information that most closely reflects the economic substance of the individual processes of the entity recognized under the rules of the legislative instruments of the accounting system. This becomes important not only due to the fact that accounting is always reflected to some extent as subjective estimates and the inadequacy of the financial statements of the accounting system.

The paper extends existing knowledge, information and detection methods of manipulated financial statements, in case of significant disruption of a true and fair view within the application of the methods of creative accounting of windows dressing and fraud. The results of case studies of five accounting periods for the entity are analyzed in variants A and C pursuing different objectives and these are subsequently reflected in the financial statements of each accounting period and in terms of Czech accounting standards. To verify the detection of manipulated financial statements the Beneish M-Score Model, the Model of the CFEBT analysis and the model of Jones Nondiscretionary Accrual were

chosen in comparison with the Altman model of Z-Score developed to assess the financial health of the business entity. The results of selected models are compared and the results are assessed.

We believe that this paper may be used by users of the financial statements or auditors for testing financial statements as a detailed test on the basis of which a risk of an accounting fraud may be identified, and moreover, it may be applied by all users of financial statements who are to consider the issue of reliability of financial statements submitted to them.

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Methodology of Theoretical Physics in Economics: Examining Price Jounce and Price Crackle

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Abstract*: This paper is part of research examining the systematic application of methods used in theoretical physics in economics. One aspect of this research is the comparison of linear and non-linear analytical structures of physics with analytical structures of economics.*

Methodological approaches of theoretical physics are used to derive the first step for constructing a principle of correspondence between economic variables and kinematic variables of non-relativistic mechanics: the path corresponds to the instantaneous commodity price; the jerk in mechanics corresponds to the price jerk. Assuming that the market value of the commodity is fully determined exclusively by the value of the instantaneous commodity price, the price jerk equation acquires the form that corresponds to the non-relativistic equation for jerk in mechanics, following from Newton´s second law of motion. In this paper price jounce and price crackle are defined.

The paper also focuses on factual research in bibliographic and biographical databases showing that representatives of the Czech School of Economics took a leading role in the methodological use of applied and theoretical physics in the basic economic research, especially in the second half of the twentieth century.

Key words: Differential Equation · Instantaneous Commodity Price · Instantaneous Relative Depreciation · Motion Equation · Correspondence Principle · Price Jerk · Price Jounce · Price Crackle

JEL Classification: A12 · C65

1 Introduction

The application of methods of classical non-relativistic mechanics in microeconomics presented in this work aims to derive a single motion equation for price which describes non-chaotic as well as chaotic fluctuations of price on a market with nearly perfect competition.

During the past four decades, great efforts have been made to understand chaotic dynamics in greater detail. Both the geometric theory of dynamics and its numeric counterpart, have proven to be powerful tools on the road to this success. For three-dimensional non-linear dynamic systems, the minimal functional forms required to generate a chaotic flow have been found and tested (Sprott, 1994).

Minimal chaotic dynamics have also been investigated from the viewpoint of jerky dynamics (Sprott, 1997; Eichhorn, Linz & Hänggi, 1998; Linz, 1998; Sprott & Linz, 2000; Munmuangsaen, Srisuchinwong & Sprott, 2011). Jerky dynamics should also be able to investigate nonchaotic as well as chaotic development over time (Eichhorn, Linz & Hänggi, 1998). Elementary jerky dynamics can also be found in economics, as shown in this paper and in the paper of professor Jiří Pospíšil (Pospíšil, 2013).

Let us briefly consider at a market with nearly perfect competition: a) in each market there are a large number of buyers and sellers, none of which are strong enough to influence the price or output of a sector; b) all goods are homogeneous; c) there is free entry to and exit from market; d) all manufacturers and consumers have perfect information about prices and quantities traded on the market; e) companies attempt to maximize profit and consumers attempt to maximize utility; f) companies and consumers have free access to information about technologies (Goodwin, Nelson, Ackerman & Weisskopf, 2009; Nicholson & Snyder, 2008). This set of assumptions is further specified by the specific quantitative expression of the degree of understanding of information about technologies: companies and consumers understand only a part $\delta(t)$ of the available amount of information about technologies at time t, where $0<\delta(t)<1$ for $t \in \langle t_0, +\infty)$, t_0 is the initial time of monitoring the commodity state.

The methodology of qualitative and quantitative physical research of any system strives to achieve one basic goal, namely that the signal to noise ratio be much greater than one. If it is possible to deliberately increase the output signal from an inanimate system above the background noise, this brings to the forefront the natural relations which are com-

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mon to different systems investigated (Roehner, 2007; Štroner & Pospíšil, 2011). Of course there are other systems which do not permit the researcher to amplify the level of output. In such case, there is another way to increase the signal to noise ratio. Here, it is necessary to continually decrease the background noise to the lowest possible level. A classic current example requiring such noise reduction is the detection of gravitational waves, the existence of which was predicted by prof. A. Einstein in his work from 1916 (Einstein, 1916). Outside the solar system, the theory predicts a number of "stellar" sources of gravitational waves, which could be detected in the event they reached Earth. For the Sun, a typical class G main-spectrum star, it has not yet been possible to theoretically determine such mechanisms which would be responsible for detectable levels of gravitational radiation (Weinberg, 1972; Papini & Valluri, 1976; Křivský & Zeithamer, 1982; Karmakar & Borah, 2013). Efforts similar to the detection of gravitational waves can be seen in numerous other multi-disciplinary fields, explored in publications such as: Physics of the Earth´s Magnetosphere, Heliometeorology and Helioclimatology, Biophysics of the Sun – Earth Relations.

A situation similar to the physical research of inanimate systems arises in the physical research of economic systems. In economic systems, one of the main reasons that the signal to noise ratio is close to one is the high degree of self-organization and self-improvement. This work is motivated by the consilient use of the mathematical apparatus of theoretical physics in mathematical economics (Richmond, Mimkes & Hutzler, 2013).

The incorporation of physics into economics in the framework of the Czech School of Economics

At the Czech School of Economics during the 19th century, no reliable sources have yet been found indicating such an interdisciplinary approach or related original work. In the second half of the twentieth century however, we do find economists at the Czech School of Economics whose works represent applications of physics in economics, i.e. in econophysics in broader sense, i.e. in physical economics. Einstein's special theory of relativity was applied by professor Pavel Hrubý (*5. 5. 1914 - †25. 6. 1994) in order to use economic spacetime for more precise economic analysis and prognosis (Hrubý and Kálal, 1974). Another Czech economist, who represents the Czech School of Economics in econophysics in broader sense, is professor František Drozen (*30. 5. 1949), whose results were inspired by the work of German railway engineer August Wöhler (*22. 6. 1819 – †21. 3. 1914). František Drozen constructed an analogy between the process of fatigue crack growth in axles of railway wagons and the process of price reduction for goods. This approach to modeling the process of falling prices for goods can be found in its final form in several of Drozen´s works (Drozen, 2003, 2008).

2 Methodology

Linear motion equation of commodity state without inflexion

In this paper it is assumed that the market value of a commodity is quantifiably determined only by the market price n of the commodity on the market with nearly perfect competition. We now make the generalizing assumption that the instantaneous acceleration of reduction of the market value is directly proportional to the instantaneous rate of reduction of the market value (Zeithamer, 2010). Then the deterministic differential equation of price which expresses this model is

$$\frac{d^2n}{dt^2}(t) = -A\frac{dn}{dt}(t)\ , \tag{1}$$

where $A > 0$ is the proportionality constant, and a negative sign is used to indicate that n, the market value of goods, i.e. a price, is decreasing and the acceleration of reduction of the market value increases over time. The initial conditions now are that over time $t = t_0$ the market value is $n(t_0) = n_0$ and $\frac{dn}{dt}(t_0) = r_0 < 0$, where t_0 is the initial time of monitoring the commodity price, $[A] = s^{-1}$; s – designates the basic time unit, seconds.

3 Results

Nonlinear motion equation of commodity state with inflexion and jerk of price

In this section of our work, we again presume the following conditions to be met: (1) the commodity is on one of the markets of a model of market structure with nearly perfect competition at initial time t_0; (2) at time t_0 the commodity is found in its initial state, which is uniquely determined by the magnitude of instantaneous commodity depreciation $w(t_0) = w_0$.

Let the acceleration $\frac{d^2n}{dt^2}$ of the instantaneous commodity price be the sum of two components, i.e.

$$\frac{d^2n}{dt^2} = \left(\frac{d^2n}{dt^2}\right)_1 + \left(\frac{d^2n}{dt^2}\right)_2 . \tag{2}$$

The first component of acceleration is a consequence of physical and chemical processes, which cause the first component of the instantaneous acceleration to increase in direct proportion to the magnitudes of rate of change of the instantaneous commodity price n, i.e.

$$\left(\frac{d^2n}{dt^2}(t)\right)_1 = B\frac{dn}{dt}(t), \tag{3}$$

where B is the proportionality constant, $B > 0$, $[B] = s^{-1}$, s – designates the basic time unit, seconds and $t \in \langle t_0, +\infty)$. The second component of acceleration results from socio-psychological processes, which cause the second component of the instantaneous price acceleration to be directly proportional to the product of the magnitude of rate of change of the instantaneous price $\frac{dn}{dt}(t)$ and the magnitude of instantaneous price $n(t)$, while the proportionality constant is negative, thus

$$\left(\frac{d^2n}{dt^2}(t)\right)_2 = -A\frac{dn}{dt}(t)\cdot n(t), \tag{4}$$

where $(-A)$ is the proportionality constant, $A > 0$, $[A] = (c.u.)^{-1}s^{-1}$, $c.u.$ – designates the basic currency unit, s – designates the basic time unit, seconds, $t \in \langle t_0, +\infty)$.

By substituting relations (3) and (4) into equation (2), we obtain the following motion equation for the acceleration of instantaneous commodity price n

$$\frac{d^2n}{dt^2}(t) = B\frac{dn}{dt}(t) - A\frac{dn}{dt}(t)\cdot n(t). \tag{5}$$

A similar equation holds for commodity relative depreciation RD (Zeithamer, 2012 b, 2013)

$$\frac{d^2RD}{dt^2} = \tilde{B}\frac{dRD}{dt}(t) - \tilde{A}\frac{dRD}{dt}(t)\cdot RD(t), \tag{6}$$

where $\tilde{A} > 0$, $\tilde{B} > 0$ are the proportionality constants, $\tilde{A} > 0$, $[\tilde{A}] = [\tilde{B}] = s^{-1}$, $t \in \langle t_0, +\infty)$.

For the motion of a solid body through space in which the magnitude of the force F of resistance in that space against the movement of the body is directly proportional to the velocity v of the body, i.e. $F = -kv(k > 0$ is the constant of proportionality), the magnitude of jerk j is expressed by the following equation (Pospíšil, 2013),

$$j = \frac{d^3s}{dt^3}(t) = -\frac{k}{m}\frac{d^2s}{dt^2}(t), \tag{7}$$

where s is the path traveled by the body, m is the mass of the body, t is time, and j is the magnitude of jerk in units m/s^3. From the equation of motion for instantaneous price (1) we get the following equation for the magnitude of price jerk j_P in units $c.u./s^3$

$$j_P = \frac{d^3n}{dt^3}(t) = -A\frac{d^2n}{dt^2}(t), \tag{8}$$

where $n(t)$ is the instantaneous price of the commodity and t is the physical time. Equations (7) and (8) are the first basic step in constructing a principle of correspondence between economic variables and physical variables of classical

nonrelativistic mechanics: the path s traveled by a solid body through space with a force of resistance against this movement is directly proportional to the velocity, which corresponds $(\leftrightarrow)$ to the instantaneous price n of a commodity in a market structure with nearly perfect competition i.e. $s \leftrightarrow n$. Equations (7) and (8) are also a second basic step in deriving a complete principle of correspondence between economic variables and physical variables: for the motion of a solid body through space, where the force of resistance against this movement is directly proportional to the velocity v, jerk j corresponds $(\leftrightarrow)$ to price jerk j_P for a commodity in a market structure with nearly perfect competition, i.e. $j \leftrightarrow j_P$.

The price jerk function $j_P(t)$ for a non-linear motion equation of commodity state with inflexion (5) may be derived in the following manner. By taking the derivative of equation (5) with respect to time t and substituting into the right side of the resulting equation for $\frac{d^2n}{dt^2}(t)$ from equation (5), we get the price jerk equation in the form

$$\frac{d^3n}{dt^3}(t) = \left(A\, n(t) - B\right)^2 \frac{dn}{dt}(t) - A\left(\frac{dn}{dt}(t)\right)^2 . \tag{9}$$

The price jerk function $j_P(t)$ on the right side of equation (9) may be expressed by a derivative of function $G(t)$ with respect to time t in the form

$$j_P(t) = \left(A\, n(t) - B\right)^2 \frac{dn}{dt}(t) - A\left(\frac{dn}{dt}(t)\right)^2 = \frac{dG}{dt}(t), \tag{10}$$

where

$$G(t) = \frac{1}{3A}\left(A\, n(t) - B\right)^3 + A\int_0^t \left(\frac{dn}{dt}(u)\right)^2 du + const., \tag{11}$$

while constants of proportionality A and B from equation (5) are expressed in the following units $[A] = (c.u.)^{-1}s^{-1}$, $[B] = s^{-1}$; $c.u.$ – designates the basic currency unit, s – designates the basic time unit, seconds. Then the price jerk equation (9) acquires the form

$$\frac{d^3n}{dt^3}(t) = \frac{dG}{dt}(t). \tag{12}$$

Equation (12) corresponds to the non-relativistic equation for mechanical jerk, following from Newton's second law of motion.

Let us define price jounce as the change in price jerk over time in units $c.u./s^4$, i.e.

$$\frac{d^4n}{dt^4}(t) = \frac{d\ j_P}{dt}(t) = \frac{d^2G}{dt^2}(t) \tag{13}$$

where

$$\frac{d^2G}{dt^2} = \left(An(t) - B\right)\frac{dn}{dt}(t)\left[4A\frac{dn}{dt}(t) - \left(An(t) - B\right)^2\right]. \tag{14}$$

Equation (13) corresponds to the non-relativistic equation for mechanical jounce, following from Newton's second law of motion.

Let us define price crackle as the change in price jounce over time in units $c.u./s^5$, i.e.

$$\frac{d^5n}{dt^5}(t) = \frac{d^2\, j_P}{dt^2}(t) = \frac{d^3G}{dt^3}(t), \tag{15}$$

where

$$\frac{d^3G}{dt^3}(t)=\left[2A\frac{dn}{dt}(t)-\left(An(t)-B\right)^2\right]^2\frac{dn}{dt}(t)-7A\left[\frac{dn}{dt}(t)\right]^2\left(An(t)-B\right)^2 \tag{16}$$

.

Equation (15) corresponds to the non-relativistic equation for mechanical crackle, following from Newton's second law of motion.

4 Conclusion

Assuming that the market value of the commodity at time t is fully determined exclusively by the value of the instantaneous commodity price $n(t)$, methodological procedures taken from theoretical physics are used to construct motion equations for a commodity's instantaneous price $n(t)$ and instantaneous relative depreciation $RD(t)$.

Motion equation (5) for instantaneous commodity price with inflexion as well as motion equation (6) for instantaneous relative depreciation with inflexion are non-linear differential equations of the second order with constant coefficients. These motion equations were derived for a sequence of markets with nearly perfect competition. The principle of correspondence takes the following form:

(1) $s \leftrightarrow n$, (2) $j \leftrightarrow j_P$, (3) $\frac{d^3s}{dt^3}(t)=-\frac{k}{m}\frac{d\left(ds/dt\right)}{dt}(t)\leftrightarrow\frac{d^3n}{dt^3}(t)=\frac{dG}{dt}(t)$

(4) $\frac{d^4s}{dt^4}(t)=-\frac{k}{m}\frac{d^2\left(ds/dt\right)}{dt^2}(t)\leftrightarrow\frac{d^4n}{dt^4}(t)=\frac{d^2G}{dt^2}(t)$, i.e. jounce $\leftrightarrow$ price jounce,

(5) $\frac{d^5s}{dt^5}(t)=-\frac{k}{m}\frac{d^3\left(ds/dt\right)}{dt^3}(t)\leftrightarrow\frac{d^5n}{dt^5}(t)=\frac{d^3G}{dt^3}(t)$, i.e. crackle $\leftrightarrow$ price crackle.

These five correspondences concluding the work present the basis for constructing a principle of correspondence between economic variables and kinematic variables of classical nonrelativistic mechanics.

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Generalization of the Notion of Point Elasticity for Functions of Multiple Variables

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Abstract*: One of the important economic notions is the so-called elasticity of functions. The study of different types of elasticity is absolutely essential for the solution to many problems in economic and business practice, for example, information about income elasticity of import, income elasticity of export etc. The issue of flexibility has engaged economists such as J. S. Mill or A. Marshall since the 19th century.*

Most often functions of one real variable have been studied. However, the fact is that economic functions are mostly functions of multiple real variables. The interest in functions of one real variable lies in the simplification of the studied problem. So it seems to be very useful to analyze the elasticity of functions of multiple variables, which is the main aim of this paper. After summarizing the properties of elasticity of real functions of multiple variables, the author illustrates its basic properties on some examples.

The elaboration of this topic is carried out with the use of the tools of modern functional analysis and differential calculus.

Key words: Point Elasticity · Functions of Multiple Variables · Scalar Product · Differential Calculus

JEL Classification: C65

1 Introduction

The The concept of elasticity, i.e., the measure of a variable's sensitivity to a change in another variable, plays an important role in many economic studies that does not need to be emphasized.

Our goal is to generalize this concept to functions of multiple variables, give some of its characterization, and demonstrate it on certain examples that have already found their application in different economic fields.

The paper is divided into four parts, the first one (Introduction) describes the definition and basic properties of elasticity of functions of one real variable. These are, namely, the elasticity of constant functions, the elasticity of product, fraction, composition, and inverse functions. Lastly, the geometric interpretation of this notion of point elasticity is described.

The second part (Methods) deals with the tools needed for the proof of the main theorem of this article. We recall the definition of the derivative of functions $f: R^n \to R^m$ and the basic rules for differentiating the sum, product, fraction, and composition of such functions. We do not give any proofs here, as they can be found in nearly any textbook devoted to mathematical analysis and differential calculus.

The third part (Research result) displays our generalization of point elasticity for functions $f: R^n \to R$ and describes its features in accord with the known results for single-variable functions (cf. Theorem 1). The theory is then applied to functions of practical importance in economics as well, namely the Cobb-Douglas functions.

Lastly, a concluding section is given at the end of the paper.

Let us start with what is known.

Definition 1 Let $f: R \to R$ be differentiable and attain either just positive, or just negative values in an open neighborhood $A \subset R$ of a given point $a \in R$, such that $f(a) \neq 0$. Then under *elasticity* of *f* at the point *a* we understand the real number

$$E_f(a) = \frac{a}{f(a)} \lim_{h \to 0} \frac{f(a+h) - f(a)}{h} = \frac{a}{f(a)} f'(a).$$

Or, equivalently, one could also define $E_f(a) = [\ln|f(x)|]'_{x=a} / [\ln|x|]'_{x=a}$.

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In the papers (Kaňka, 2012) and (Kaňka & Kaňková, 2012) some properties of the elasticity of single-variable real functions have been derived, the proofs of which have been easy by using any of the two aforementioned formulas. Let us recall these characteristics.

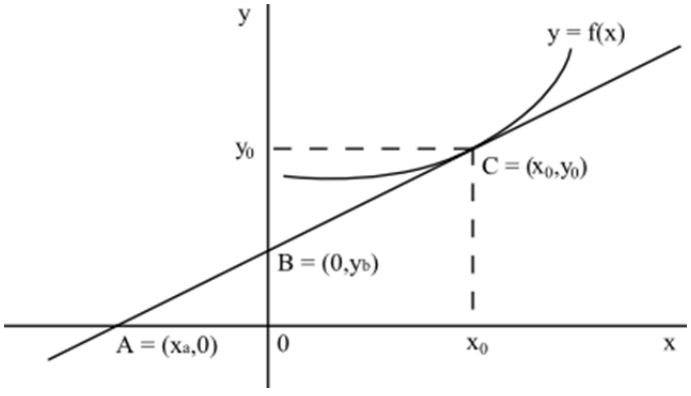
Theorem 1 Let the functions $f: R \to R$, $g: R \to R$, $f_i: R \to R$, $i = 1, \dots, m$, m a given natural number, satisfy the conditions of Definition 1. Then

1) The functions f and $c\,f$, where $c \neq 0$, have the same elasticity at the point a.
2) For the elasticity of the sum $f = f_1 + f_2 + \cdots + f_m$ at a the following bound holds
$$E_{\min}(a) \leq E_f(a) \leq E_{\max}(a), \quad \text{where } E_{\min}(a) = \min\{E_{f_i}(a)\}_{i=1,\dots,m}, E_{\max}(a) = \max\{E_{f_i}(a)\}_{i=1,\dots,m}.$$
3) For the elasticity of the product $f_1 f_2$ at a it holds that $E_{f_1 f_2}(a) = E_{f_1}(a) + E_{f_2}(a)$.
4) For the elasticity of the fraction f_1/f_2 at a it holds that $E_{f_1/f_2}(a) = E_{f_1}(a) - E_{f_2}(a)$.
5) For the elasticity of the compound function $f \circ g$ at a it holds that $E_{f\circ g}(a) = E_f\big(g(a)\big)E_g(a)$.
6) For the elasticity of the inverse f^{-1} at a it holds that $E_{f^{-1}}(a)E_f\big(f^{-1}(a)\big) = 1$.
7) (Geometric interpretation of elasticity) Let the function $y = f(x)$ be in a neighborhood $I = (x_0 - \delta, x_0 + \delta)$ of the point $x_0 \neq 0$, $\delta > 0$, positive and let $E_{yx}(x_0)$ be its elasticity at x_0. Then the (proper) derivative $f'(x_0)$ exists and it holds that
$$E_{\mathrm{yx}}(x_0) = \frac{x_0}{f(x_0)} f'(x_0)\,.$$

Let us suppose that $f'(x_0) \neq 0$. Then the curve $y = f(x)$ admits a tangent at the point C, which is described by the equation $y - y_0 = f'(x_0)\,(x - x_0)$, that intersects then both coordinate axes (see Figure 1), namely the axis $x = x_a$ at the point A and axis $y = y_b$ at the point B. The vector $\overrightarrow{BC}$ connecting the point B with C is $(x_0, y_0 - y_b)$, the vector $\overrightarrow{AC}$ connecting the point A with C has components $(x_0 - x_a, y_0)$. From the equation of the tangent it follows for $x = 0$ that $y_b - y_0 = -x_0 \cdot f'(x_0)$, also that $-y_0 = f'(x_0) \cdot (x_a - x_0)$ for $y = 0$, therefore, we have $x_a - x_0 = -y_0/f'(x_0)$, and thus $\overrightarrow{BC} = \big(x_0, x_0 f'(x_0)\big) = x_0 \cdot (1, f'(x_0))$, while, $\overrightarrow{AC} = (y_0/f'(x_0), y_0) = y_0 \cdot \left(\frac{1}{f'(x_0)}, 1\right)$. Taking the fraction of the square of the length of these vectors yields after a short calculation that

$$\frac{\left|\overrightarrow{BC}\right|^2}{\left|\overrightarrow{AC}\right|^2} = \frac{x_0^2}{y_0^2} f'^2(x_0) \quad \Longrightarrow \quad \left|E_{yx}(x_0)\right| = \frac{\left|\overrightarrow{BC}\right|}{\left|\overrightarrow{AC}\right|}.$$

Figure 1 Geometric interpretation of elasticity



Source: own drawing

2 Methods

Throughout the work, we shall elaborate the basic and well-known concepts of differential calculus of functions of a single and multiple variables, as well. Here we give only the definitions and statements needed, the proofs of which shall, however, be omitted. An introduction to these problems can be found, e.g., in (Solodovnikov, Babaytsev, Brailov, & Shandra), (Nagy, 1976) or (Sikorski, 1969), among others.

As to the notation, R^n denotes the set of real *n*-dimensional numbers, for a given $n \in N$ stands for the set of natural numbers. As usual, we will call a mapping $f: R^n \to R^m$ *differentiable* at a certain point $a \in R^n$, if there exists (then it is unique) a linear map $\lambda_a: R^n \to R^m$ such that

$$\lim_{h \to 0} \frac{|f(a+h) - f(a) - \lambda_a(h)|}{|h|} = 0.$$

We call λ_a the *derivative* of *f* at the point *a* and denote by $Df(a)$. Note that *f* is differentiable on an open set $A \subset R^n$, if it is differentiable at every $a \in A$. As it will not lead to misunderstandings, sometimes we will not distinguish between the derivative $Df(a)$ and its *Jacobian matrix* $f'(a) = \left(D_j f^i(a)\right)_{\substack{i=1,\dots,m \\ j=1,\dots,n}}$ with respect to the standard bases in R^n and R^m, which, under certain hypotheses, follows from:

Theorem 2 If $f: R^n \to R^m$ is differentiable at $a \in R^n$, then all of its partial derivatives $D_j f^i(a)$ exist, and the derivative $Df(a)$ is equal to the Jacobian matrix. Conversely, let all the partial derivatives $D_j f^i(a)$ of the function $f: R^n \to R^m$ exists and be continuous on an open set containing *a*, then *f* is differentiable at *a*.

The basic properties, that will be needed later on, are summarized in the next theorem.

Theorem 3 Let $f, f_1, f_2: R^n \to R^m$ and $g: R^m \to R^p$, where *n*, *m*, $p \in N$, be continuously differentiable – for the sake of simplicity – everywhere on their domains, $a \in R^n$ arbitrary. Then

1) If *f* is a constant function, then $Df(a) = 0$.
2) If $c \in R$ is a constant, then $D(cf)(a) = cDf(a)$.
3) It holds that $D(f_1 \pm f_2)(a) = Df_1(a) \pm Df_2(a)$.
4) It holds that $D(f_1 f_2)(a) = f_2(a)Df_1(a) + f_1(a)Df_2(a)$.
5) If $f_2(a) \neq 0$, then $D\left(\frac{f_1}{f_2}\right)(a) = \frac{f_2(a)Df_1(a) - f_1(a)Df_2(a)}{[f_2(a)]^2}$.
6) (multidimensional chain rule) The compound function $g \circ f: R^n \to R^p$ is differentiable at *a*, and it holds that

$$D(g \circ f)(a) = Dg\big(f(a)\big)Df(a).$$

3 Research results

One possible generalization of the notion of point elasticity of single-variable real functions to functions of *n* variables is given by (1), which elaborates the scalar product of two vectors. Then we prove analogous characteristics for this generalized elasticity as in the classical one-dimensional case. However, there are differences as well. Lastly, we calculate this generalized elasticity in the case of some functions widely used among economists.

Definition 2 Let $f: R^n \to R$ be defined on an open set $A \subset R^n$ containing the point $a = (a^1, \dots, a^n)$, while $f(a) \neq 0$. Moreover, let *f* be differentiable at *a*. We define the *elasticity* of *f* at the point *a* as the real number

$$E_f(a) = \frac{a \cdot Df(a)}{f(a)}, \tag{1}$$

where $a \cdot Df(a)$ denotes the scalar product $a_1 D_1 f(a) + a_2 D_2 f(a) + \cdots + a_n D_n f(a)$ of the vectors $a = (a^1, \dots, a^n)$ and $Df(a) = (D_1 f(a), \dots, D_n f(a))$.

If not said otherwise, we will consider only functions of this type.

Theorem 4 Let the functions $g: R^m \to R$, $f_i: R^n \to R$, $n \in N$, for $i = 1, \dots, m$, $m \in N$, be continuously differentiable and non-zero at a given point $a \in R^n$. Then the following holds:

1) If $c \in R$ is non-zero, then the functions *g* and *cg* have the same elasticity at the point *a*.
2) If $f = f_1 + f_2 + \cdots + f_m$, then for its elasticity $E_f(a)$ at *a* it holds that

$$E_{\min}(a) \leq E_f(a) \leq E_{\max}(a),$$

where $E_{\min}(a)$ and $E_{\max}(a)$ are as before, cf. Theorem 1 2).

3) For the point elasticity of the product $f_1 f_2$ it holds that $E_{f_1 f_2}(a) = E_{f_1}(a) + E_{f_2}(a)$.

4) For the point elasticity of the fraction f_1/f_2 it holds that $E_{f_1/f_2}(a) = E_{f_1}(a) - E_{f_2}(a)$.

5) For the point elasticity of the compound $E_{g\circ f}(a)$, where $f = (f_1, f_2, \dots, f_m): R^n \to R^m$, it holds that

$$E_{g\circ f}(a) = \frac{a \cdot [Dg\big(f(a)\big)Df(a)]}{g(f(a))}.$$

Proof. With the help of some basic operations of multidimensional differential calculus, usually a short calculation leads us to the result.

1) There is

$$E_{cg}(a) = \frac{a \cdot D(cg)(a)}{(cg)(a)} = \frac{a \cdot cDg(a)}{cg(a)} = \frac{c(a \cdot Dg(a))}{cg(a)} = \frac{a \cdot Dg(a)}{g(a)} = E_g(a).$$

2) There is

$$\begin{aligned} E_f(a) &= \frac{a \cdot D(f_1 + \dots + f_m)(a)}{f(a)} = \frac{a \cdot (Df_1(a) + \dots + Df_m(a))}{f(a)} = \\ &= \frac{1}{f(a)} \sum_{i=1}^{m} a \cdot Df_i(a) = \frac{1}{f(a)} \sum_{i=1}^{m} f_i(a) E_{f_i}(a) \leq \\ &\leq E_{\max}(a) \frac{f(a)}{f(a)} = E_{\max}(a). \end{aligned}$$

The proof of the lower bound on $E_f(a)$ follows after an analogous calculation.

3) There is

$$\begin{aligned} E_{f_1 f_2}(a) &= \frac{a \cdot D(f_1 f_2)(a)}{(f_1 f_2)(a)} = \frac{a \cdot [f_2(a)Df_1(a) + f_1(a)Df_2(a)]}{f_1(a) \cdot f_2(a)} = \\ &= \frac{f_2(a)[a \cdot Df_1(a)] + f_1(a)[a \cdot Df_2(a)]}{f_1(a) \cdot f_2(a)} = \frac{a \cdot Df_1(a)}{f_1(a)} + \frac{a \cdot Df_2(a)}{f_2(a)} = E_{f_1}(a) + E_{f_2}(a). \end{aligned}$$

4) There is

$$\begin{aligned} E_{f_1/f_2}(a) &= \frac{a \cdot \left[\frac{f_2(a)Df_1(a) - f_1(a)Df_2(a)}{[f_2(a)]^2}\right]}{\frac{f_1(a)}{f_2(a)}} = \\ &= \frac{f_2(a)[a \cdot Df_1(a)] - f_1(a)[a \cdot Df_2(a)]}{f_1(a) \cdot f_2(a)} = \frac{a \cdot Df_1(a)}{f_1(a)} - \frac{a \cdot Df_2(a)}{f_2(a)} = E_{f_1}(a) - E_{f_2}(a). \end{aligned}$$

5) It follows from the theorem for the differentiation of compound functions.

□

We wish that the elasticity of compound functions could be expressed by the elasticities of the individual components, cf. Theorem 1 5), this is, however, not feasible due to the way we generalized the notion of point elasticity for multiple-variable functions. Similarly, a theorem about the elasticity of the inverse function cannot be formulated either (except for the case when $n = 1$, but this has already been covered).

Remark 1 On the other hand, the following component-wise characterization of the point elasticity for multidimensional functions gives a deeper insight. As before, let $f: R^n \to R$ be a differentiable function such that $f(a) \neq 0$, for some $a = (a^1, \dots, a^n) \in R^n$. Further, define the mappings $k_i: R \to R^n$, $i = 1, \dots, n$, as $k_i(x^i) = (a^1, \dots, a^{i-1}, x^i, a^{i+1}, \dots, a^n)$, for all $x^i \in R$. The mappings k_i are linear, therefore differentiable. Furthermore, we have $D_i f(a) = D(f \circ k_i)(a^i)$, thus obtaining the relation

$$\begin{aligned} E_f(a) &= \frac{a \cdot Df(a)}{f(a)} = \frac{(a^1, \dots, a^n) \cdot (D(f \circ k_1)(a^1), \dots, D(f \circ k_n)(a^n))}{f(a)} = \\ &= \sum_{i=1}^{n} \frac{a^i D(f \circ k_i)(a^i)}{(f \circ k_i)(a^i)} = \sum_{i=1}^{n} E_{f\circ k_i}(a^i), \end{aligned}$$

where $E_{f\circ k_i}(a^i)$ are classical point elasticities of single-variable functions, and their geometric interpretation has already been depicted.

Now, let us demonstrate the theory on some particular examples that are of special interest also for the economists.

Example 1 Let us consider the so-called Cobb-Douglas function $f(x,y) = Ax^{\alpha}y^{\beta}$ with a non-zero real constant *A* and *x,y >0* and *A > 0* exponents $\alpha = 1/2$ and $\beta = 1/3$. Its partial derivatives

$$D_x f(x,y) = \frac{A}{2}x^{-\frac{1}{2}}y^{\frac{1}{3}}, \quad D_y f(x,y) = \frac{A}{3}x^{\frac{1}{2}}y^{-\frac{2}{3}}$$

exist and are continuous in some open set of the plane R^2 containing a given point $(a,b) \in R^2$ with positive coordinates. Thus *f* is differentiable and $f'(a,b) = \left(\frac{A}{2}a^{-1/2}b^{1/3}, \frac{A}{3}a^{1/2}b^{-2/3}\right)$. The elasticity of the Cobb-Douglas function can now be easily computed as follows:

$$E_f(a,b) = \frac{(a,b)\cdot\left(\frac{A}{2}a^{-1/2}b^{1/3}, \frac{A}{3}a^{1/2}b^{-2/3}\right)}{Aa^{1/2}b^{1/3}} = \frac{\frac{A}{2}a^{1/2}b^{1/3} + \frac{A}{3}a^{1/2}b^{1/3}}{Aa^{1/2}b^{1/3}} =$$
$$= \frac{1}{2} + \frac{1}{3} = \alpha + \beta = \frac{5}{6}.$$

So, the elasticity of the Cobb-Douglas function is constant at any arbitrary point $(a,b) \in R^2$ with positive coordinates, where *A* > 0. In view of Remark 1, we can compute that $(f \circ k_1)(x) = Ax^{1/2}b^{1/3}$ and $(f \circ k_2)(y) = Aa^{1/2}y^{1/3}$, where *A* > 0 yielding the component-wise elasticities

$$E_{f\circ k_1}(a) = \frac{a\left[Ax^{1/2}b^{1/3}\right]'_{x=a}}{(f\ o\ k_1)(a)} = \frac{\frac{A}{2}a^{1/2}b^{1/3}}{Aa^{1/2}b^{1/3}} = \frac{1}{2},$$
$$E_{f\circ k_2}(b) = \frac{b\left[Aa^{1/2}y^{1/3}\right]'_{y=b}}{(f\ o\ k_2)(b)} = \frac{\frac{A}{3}a^{1/2}b^{1/3}}{Aa^{1/2}b^{1/3}} = \frac{1}{3},$$

verifying thus our previously obtained result.

Through an analogous process one can show that for the general case when $f(x) = Ax_1^{\alpha_1}x_2^{\alpha_2}\ldots x_n^{\alpha_n}$, where the coordinates x_i, $i = 1,\ldots,n$, are positive and $A > 0, \alpha_i > 0, i = 1,\ldots,n$, are given real constants, the point elasticity of *f* is constant at any arbitrary point in R^n with positive coordinates and it is equal to the number $\alpha_1 + \alpha_2 + \cdots + \alpha_n$.

Remark 2 (Geometric interpretation in R^3, see (Spivak, 1965) or (Bureš & Kaňka, 1994) as well. If we study a function $z = f(x,y)$ that is a two-dimensional surface in R^3, then the elasticity of *z* at a given point $(a,b) \in R^2$ is equal to the sum of

1) the elasticity of the cross-section $z_a(y) = f(a,y)$ of the surface *z* with the plane *x* = *a* at *b*, and
2) the elasticity of the cross-section $z_b(x) = f(x,b)$ of the surface *z* with the plane *y* = *b* at *a*.

Example 2 Let $f: R^2 \to R$ be defined as $f(x,y) = (Ax^{\alpha} + By^{\alpha})^{1/\alpha}$, where *A* > 0 and *B* > 0 are constants, $x > 0$, $y > 0$, $\alpha > 0$. Then, again, the partial derivatives

$$D_x f(x,y) = A(Ax^{\alpha} + By^{\alpha})^{-(\alpha-1)/\alpha}x^{\alpha-1}, \quad D_y f(x,y) = B(Ax^{\alpha} + By^{\alpha})^{-(\alpha-1)/\alpha}y^{\alpha-1}$$

exist and are continuous in a neighborhood of a given point $(a,b) \in R^2$ with positive coordinates, thus *f* is differentiable at this point and it holds that $f'(a,b) = (Aa^{\alpha} + Bb^{\alpha})^{-(\alpha-1)/\alpha}.(Aa^{\alpha-1}, Bb^{\alpha-1})$. For the elasticity at this particular point we get that

$$E_f(a,b) = \frac{(a,b)\cdot(Aa^{\alpha} + Bb^{\alpha})^{-(\alpha-1)/\alpha}(Aa^{\alpha-1}, Bb^{\alpha-1})}{(Aa^{\alpha} + Bb^{\alpha})^{1/\alpha}} =$$
$$= \frac{(Aa^{\alpha} + Bb^{\alpha})^{-(\alpha-1)/\alpha}(Aa^{\alpha} + Bb^{\alpha})}{(Aa^{\alpha} + Bb^{\alpha})^{1/\alpha}} = 1,$$

namely, it is also constant at every two-dimensional point with positive coordinates.

Example 3 Let $f: R^2 \to R$ be given by $f(x,y) = 5xy/(x^2 + y^{\frac{1}{2}})$. It is easy to see that the partial derivatives

$$D_x f(x,y) = \frac{5y(y^{1/2} - x^2)}{(x^2 + y^{1/2})^2}, \quad D_y f(x,y) = \frac{5x(2x^2 + y^{1/2})}{2(x^2 + y^{1/2})^2}$$

exist and are continuous at any point $(a,b) \in R^2$ such that $a \neq 0$ and $b > 0$. Thus f is differentiable at (a,b) and it holds that

$$f'(a,b) = \frac{5}{2(a^2 + b^{1/2})^2} \cdot \left(2b^{3/2} - 2a^2 b, 2a^3 + ab^{1/2}\right).$$

Hence, the elasticity of f can be computed as:

$$\begin{aligned} E_f(a,b) &= \frac{5}{2(a^2 + b^{1/2})^2} \frac{(a,b) \cdot (2b^{3/2} - 2a^2 b, 2a^3 + ab^{1/2})}{5ab/(a^2 + b^{1/2})} = \\ &= \frac{5}{2(a^2 + b^{1/2})^2} \frac{2ab^{3/2} - 2a^3 b + 2a^3 b + ab^{3/2}}{5ab/(a^2 + b^{1/2})} = \\ &= \frac{5}{2(a^2 + b^{1/2})^2} \frac{3ab^{3/2}}{5ab/(a^2 + b^{1/2})} = \frac{3}{2} \frac{ab^{3/2}}{(a^2 + b^{1/2})ab} = \frac{3}{2} \frac{b^{1/2}}{a^2 + b^{1/2}}. \end{aligned}$$

For example, there is

$$E_f(2,9) = \frac{3}{2} \frac{3}{4+3} = \frac{9}{14} \doteq 0.643.$$

4 Conclusions

The paper deals with the topic of the notion of point elasticity of functions of multiple variables $f: R^n \to R$, which may be useful not only in economics but also in mathematics. The mathematical analysis reveals a problem that is still open, namely the problem of the definition of elasticity of compound functions $f: R^n \to R^m$, and $g: R^m \to R^p$. The elasticity of the compound in this case cannot be expressed similarly as in the case of real functions $f: R \to R$ or the component-wise expression for $f: R^n \to R$.

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Identification of Successful Sellers in Online Auction

Ladislav Beránek, Václav Nýdl, Radim Remeš[1]

Abstract*: The design of efficient methods concerning prediction of preferences of sellers on online auctions is an important problem in the study of Internet auctions. In this paper, a new prediction method is proposed based on Dempster - Shafer theory of evidence. The proposed method is based on the approach used in complex networks when determining influential nodes using for example centrality measures. The suggested method takes into account the degree and strength of each node which is expressed as the number of positive evaluations (degree of reputation of a seller) and the price of sold goods (by certain seller). The effects of both reputation and price of each seller who sold certain goods are represented by basic belief assignments (BBAs). The proposed prediction of the choice of sellers on online auctions is then determined by a combination of these BBAs when so-called auction preference index is calculated. Experiments are used to illustrate the effectiveness of the proposed method.*

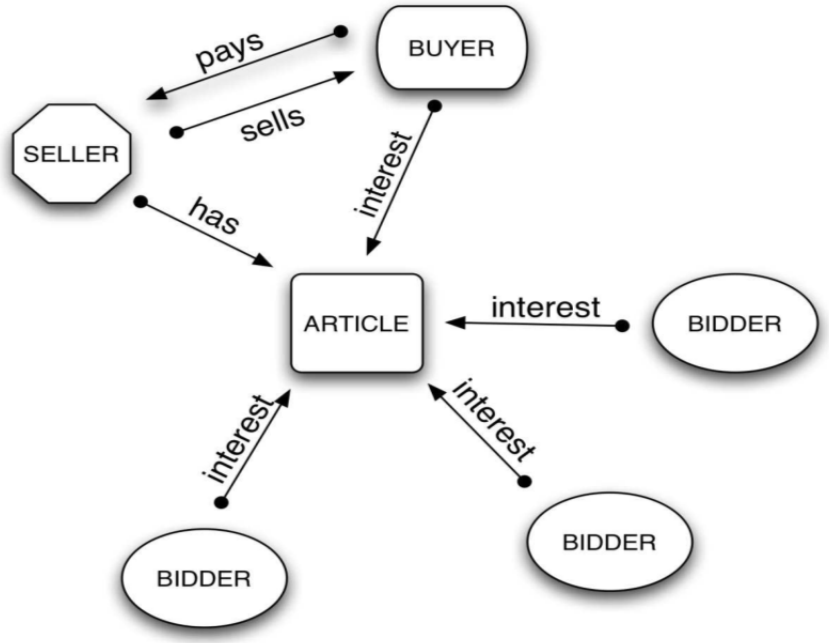
Key words: Dempster - Shafer Theory · Online Auction · Preference Prediction · Influential Sellers · Link Prediction

JEL Classification: D83 · C88

1 Introduction

The internet has changed the way people communicate, work, and doing business. One example are online auction sites, the largest being eBay with its more than 150 million registered users worldwide. An interesting aspect of eBay's success is its transparency. The market is fully transparent as the trading history of every user is disclosed to everyone on the internet. We here study the relationship between the participants of this market.

Figure 1 Structure of a single auction.



Source: Reichardt and Bornholdt (2007a)

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Users express their common interest in a particular article by bidding. The user with the highest bid wins the auction and exchanges money and the article with the seller. eBay earns a fee with every transaction. Users of the auction site, i.e. bidders, buyers or sellers, may change their role in a different auction of another article (Reichardt & Bornholdt, 2007a).

Let us first recall the operating principle of an online auction in Figure 1. Users may offer goods through the online platform and set a deadline when their auction will end. Articles are listed under a certain taxonomic product category by the seller and are searchable platform wide. Users with a particular demand either browse through the articles listed in an appropriate category or search for articles directly. Until the end of the auction they may bid on the article. The user with the highest bid at the end of the auction wins (so called hard-close) and buys the article. In every new auction, users may assume different new roles as sellers, bidders or buyers. The market can be represented as a graph with the users and/or articles as the nodes and the links denoting their interactions as shown in Figure 1.

The behavior of users on electronic markets has been studied for quite a long time now (Alt & Klein, 2011). Besides the analyses of overall structure of on-line auctions (Hou & Blodgett, 2010; Beranek & Knizek, 2012), much attention was devoted to the problem of winning strategy (Borle et al., 2006; Bouchaud & Potters, 2003; Srinivasan & Wang, 2010; Wang & Hu, 2009; Yang & Kahng, 2014) and timing of the placement of bids (Borle et al., 2006; Namazi & Schadschneider, 2006; Shmueli et al., 2006; Yang & Kahng, 2006). The study of network aspects of on-line auctions was initiated in the work (Yang et al., 2006) and then it was investigated in depth (Jank & Yahav, 2010; Yang et al., 2006). One of the most important questions asked was how the agents on the network cluster spontaneously (Peng & Muller, 2008; Radicchi et al., 2011; Reichardt & Bornholdt, 2007b; Skorpil & Stastny, 2009; Slanina & Konopasek, 2010). Some studies concentrate mainly on the amount and quality of fluctuations of prices (Pigolotti et al., 2011; Shergill & Chen, 2005; Strader & Shaw, 1997). Many of these studies use concepts and tools based on social networks theory (Jin et al., 2007; Yang & Kahng, 2006) to the description of the behavior on online and electronic markets.

In this paper, we use theory of belief functions to model the influence of these parameters on the selection of a seller. We expressed the effect of these parameters with the help of basic belief assignments (*BBA*s) introduced in the Dempster-Shafer evidence theory (Shafer, 1976). The prediction of the preference for certain seller is then calculated as a combination of both *BBA*s in a so-called auction preference index which is a measure of inclination to select a particular seller. We verified the predictive power of our proposed model. Experimental results show that the model can give good results. Specifically, we analyzed data from the online auction portal Aukro.cz, which was the Czech Republic division of the multinational Allegro group.

The paper is organized as follows. Model of the prediction of the choice of a seller in online auction is developed in Section 2. The experiments based on data obtained from online auction portal Aukro.cz are described in Section 3. Conclusions and discussion are presented in Section 4.

2 Model of the prediction of the choice of a seller in online auction

An approach based on above described centrality measures was used to assess the preference for a seller in an online auction. The preference of the seller is identified by the help of Dempster-Shafer theory. Two *BBA*s of a seller are obtained based on the reputation and price of offered goods, respectively. An evaluation method of preference of a seller is established by Dempster's rule of combination. We get the *BBA* for selection of certain seller by buyers. We call this *BBA the auction preference index*.

The definition of belief functions.

We define a frame of discernment Ω (Shafer, 1976). For simplicity, in the proposed method, there are two elements connecting with belief about the influence of reputation (number of positive comments) and price of offered goods: high (h) and low (l). Thus, a frame of discernment Ω is given as $\Omega = (h, \mathrm{l})$. The power set of the set Ω (the set of all subsets) 2^{Ω} has three elements (we do not consider the empty set): $2^{\Omega} = \{\{h\}, \{\mathrm{l}\}, \Omega\}$, where $\{h\}$ represents that a seller is highly preferred by buyers, $\{\mathrm{l}\}$ means that a seller is not preferred by buyers and $\{\Omega\}$ denotes ignorance. It means that we cannot assess whether a given seller is preferred or not.

Reputation. The user's reputation is based on evaluations by individual participants upon completion of each transaction. The users of the online auction are given a form (which can also include space for comments) which they fill out upon completion of a transaction. The users (buyers, bidders) assign points to other users (sellers) and evaluate the following aspects: the description of the sold item on the auction website (whether it corresponds to the actual item), the quality of communication with the seller, the speed of delivery, and the quality of delivery. Users can also add other

remarks in the text window provided in the form. Buyers tend to buy goods from a seller who has good reputation (Resnick et al. 2006). Such seller is trustworthy for them. The belief functions expressing a preference based on reputation have the following form:

$$m_{ri}(\{h\}) = \lambda \frac{|r_i - r_m|}{r_M - r_m}$$

$$m_{ri}(\{l\}) = \lambda \frac{|r_i - r_M|}{r_M - r_m} \tag{2}$$

$$m_{ri}(\Omega) = 1 - m_{ri}(\{h\}) - m_{ri}(\{l\})$$

where λ is the weight of this evidence. We can intuitively read this weight as a reliability of this evidence, r_i is the reputation (number of positive comments) of the seller i (i = 1,2, …, N). The item r_M is defined as: $r_M = \max\{r_i\}_{i=1}^{N}$ and similarly $r_m = \min\{r_i\}_{i=1}^{N}$. N is the number of explored users.

Success rate parameter Y_i. This parameter predicts successful rate of online auction. It is influenced by cost effeteness (i.e., start bid/listed Price), description of the sold goods and clear selling reason concerning the sold goods, see (Chan & Luo, 2008). Authors construct a prediction model to predict successful rate of online auction. They use regression equation in the form:

$$Y_i = 0.588 - 0.516\, X_{1i} - 0.037\, X_{2i} + 0.0105\, X_{3i},$$

where Y_i is success rate parameter ($0 \le Y \le 1$), X_{1i} is cost effeteness (start bid/listed price), X_{2i} is (excellent) description of the item and X_{3i} is clear selling reason. All quantities X_1, X_2, X_3 belongs to the interval (0,1). They must be determined individually for every seller.

The belief functions expressing a preference based on price and item description will have the following form:

$$m_{Yi}(\{h\}) = \eta \frac{|Y_i - Y_m|}{Y_M - Y_m}$$

$$m_{Yi}(\{l\}) = \eta \frac{|Y_i - Y_M|}{Y_M - Y_m} \tag{3}$$

$$m_{Yi}(\Omega) = 1 - m_{Yi}(\{h\}) - m_{Yi}(\{l\})$$

where η is the weight of this evidence. We can intuitively read this weight as a reliability of this evidence, Y_i is the success rate parameter of the seller i (i = 1,2, …, N). The item Y_M is defined as: $Y_M = \max\{Y_i\}_{i=1}^{N}$ and similarly $Y_m = \min\{Y_i\}_{i=1}^{N}$. N is the number of explored users (sellers).

Combination of preference signs (proofs). Once we obtain the belief functions, we combine them in a consistent manner to get a more complete assessment of what the two signs indicate. The combination of belief functions is done with the help of the Dempster's combination rule (Shafer, 1976). We express the assumption the preference concerning the seller i with the help of belief function $m_i(\{\cdot\})$. We calculate the value $m_i(\{\cdot\})$ using the combination of single belief functions expressing appropriate evidence:

$$m_i(\{\cdot\}) = (m_{ri} \oplus m_{pi})(\{\cdot\}) \tag{4}$$

The operator $\oplus$ is the Dempster's rule of belief function combination (Shafer, 1976):

$$(m_{ri} \oplus m_{pi})(\{h\}) = \frac{1}{K}\left[m_{ri}(\{h\}) \cdot m_{pi}(\{h\}) + m_{ri}(\{h\}) \cdot m_{pi}(\Omega) + m_{ri}(\Omega) \cdot m_{pi}(\{h\})\right]$$

$$(m_{ri} \oplus m_{pi})(\{l\}) = \frac{1}{K}\left[m_{ri}(\{l\}) \cdot m_{pi}(\{l\}) + m_{ri}(\{l\}) \cdot m_{pi}(\Omega) + m_{ri}(\Omega) \cdot m_{pi}(\{l\})\right] \tag{5}$$

$$(m_{ri} \oplus m_{pi})(\{\Omega\}) = \frac{1}{K}\left[m_{ri}(\Omega) \cdot m_{pi}(\Omega)\right]$$

where K: $$K = 1 - (m_{ri}(\{h\})m_{pi}(\{l\}) + m_{ri}(\{l\})m_{pi}(\{h\}))$$

We get the *BBA* of the preference as $m_i = (\{m_i(h)\},\{m_i(l)\},m_i(\Omega)\})$.

We finally calculate the *auction preference index* as:

$$API_i = m_i(h)\text{-}m_i(l) \tag{6}$$

where API_i is a real number, the higher the value, the more preferred is the certain seller.

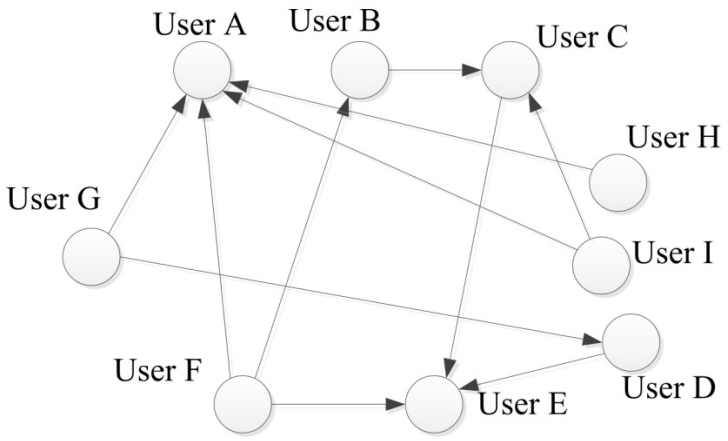
3 Results of Experiments

To demonstrate the feasibility of the suggested reputation mechanism, we tested our methodology using real auction data from Aukro.cz. The dataset we collected consists of completed Aukro auctions in the category of "Electronics", subcategory "Tablets and e-book readers". This dataset was collected over the course of more than 49 days. We explored the bidding history of multiple auctions and the reputations of sellers and bidders participating in 108 of auctions, with a total of 362 bidders and sellers. We investigated the bidding history of every bidder who participated in this auction and we also investigated past auctions hosted by a particular seller.

We counted particularly the total number of positive and total comments, total number of bids, number of wins, ID of the bidder who won the auction, prices of offered goods. We used an Aukro API interface that enables an automatic gathering of basic information about auctions.

Figure 2 shows the auction site as a social network with nine nodes. Based on the data obtained from Aukro, we arranged social network. The data was collected from auctions on Aukro which dealt with the selling the similar object "Tablet Apple iPad WIFI min 16GB". For simplification, we labeled users with only symbolic IDs instead of their Aukro IDs. The user A, B, C, D and E offered this object, while the users B, C and D also gave their bid in the auctions with these goods. Users F, G, H and I were only buyers. Hence users can be in the role of seller and buyer. On auction portals, these role changes, anyone can buy or sell goods at the same time on the online auction. This relationship is in the network presented by arrows (see Figure 1). The edge with arrow represents the completed purchase between users. For example user G bought tablet from the seller A and seller D. Corresponding values for the calculation of *the auction preference index* are presented in Table 1.

Figure 2 On-line auction as a social network



Source: authors

We used equations (2), (3), (4) and (6) to calculate the *BBA* of preference for seller (*the auction preference index*), the sixth column in the Table 1. To do this, we had to calculate the values of parameters λ and η. The calculations were performed on the basis of statistical analysis. Positive reference and the weight given price are listed in Table 1, in the second and the third columns. The value of resulted preference *BBA* is given in the fourth and the fifth column. The sixth column includes the value of *the auction preference index API*. The seventh column gives the number of actual concluded deals which the respective sellers realized.

The Figure 2 shows that users F, G, H and I are the only buyers. We do not calculate the preference value for them, therefore. *Auction preference index* value ranges in (–1, 1). The auction preference index 1 means very important, catchpenny for buyers. This means that buyers will prefer this seller who has the preference value near 1. Conversely, the value –1 means that the buyer will prefer the seller with the preference near to the value –1 the least.

Table 1 The value of auction preference index of sellers on online auction

User	r_i	p_i	$m_i(h)$	$m_i(l)$	API_i	Number of actual concluded deals
A	51	90	0.85315668	0.143531065	0.709626	4
B	29	90	0.017285487	0.980432829	–0.96315	1
C	15	86	0.299632069	0.698186785	–0.39855	2
D	10	85	0.190362477	0.807407241	–0.61704	1
E	5	81	0.803897686	0.182704019	0.621194	3
F	5	-	-	-	-	-
G	5	-	-	-	-	-
H	24	-	-	-	-	-
I	8	-	-	-	-	-

Source: own calculations

As it can be seen from the sixth column of Table 1 the order of the nodes based on the preference value is A> E> C> D> B. According to the Table 1, we also see that the number of trades performed by the seller A is also the highest. Seller A has a high number of positive references and sells for an average price. It is interesting that the seller E is also quite successful. She has a few positive references, but the price of goods put very low. Therefore she sells quite successfully. Seller C is between the seller A and the seller E. She has a higher number of positive references than the seller E but also a higher price. It can be also seen from the Table 1 that the number of deals which realized the sellers corresponds to *the auction preference index* (*API*).

4 Conclusions

In this document, prediction of the best seller is considered. The prediction value is proposed on the basis of the Dempster-Shafer theory of evidence. The reputation of a seller (number of positive comments) and the price of sold goods by this seller are considered as the main parameters for the preference for certain seller.

We performed a number of experiments. Experiment show that the proposed approach can well identify influential sellers. The proposed method is applicable not only to the application of the theory of Dempster-Shafer evidence, but also enriches the method of assessment of online auction activities as complex networks. Nevertheless we are also aware that the mathematical formalization and thorough statistical verification of parameters λ and η used in our model is necessary to increase the practical usefulness of our model.

We are convinced that the use of the Demster-Shafer theory can provide a practical approach and can be used for the calculation of preference for sellers in real online auctions. We hope that our study has contributed to the deepening of understanding of activities within online auctions. Effective modeling of users' preference provides benefits not only to potential buyers but also to sellers and online auction operators. The model serves to differentiate between sellers and can also be advantageous to sellers who provide high quality products and services.

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Probabilistic Optimization in Environmental Politics

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Abstract*: In this paper we provide an optimization methodology to deal with problems of incorporating ecological arrangements to new big industrial or transport constructions. The methodology relies on stochastic optimization, namely optimization with probabilistic (chance) constraints. We describe main features of the model, identify an uncertainty factors, and formulate the problem as a problem with stochastic constraints. To illustrate the introduced methodology we provide a simple example involving indicators of ecological stability.*

Key words: Indicators of Ecological Stability · Uncertainty · Stochastic Optimization · Probabilistic Constraints

JEL Classification: C44 · C61

1 Introduction: Environmental Policy

The modern society is characterized, among others, by a growing number of constructions as a result of public and private investments that support economic development. Many of these investments are expected to create and support the environment for subsequent private sector investments, as investments into education, research, innovations, science, labor market. Our interest is devoted to the building activities: preparation of industrial zones around big cities and necessary additional infrastructure as represented for example by transport line constructions (highways and railways). The transportation strategy policy, as defined by the Government of the Czech Republic, covers several main purposes

- construction of motorways and expressways;
- construction of municipality road by-passes;
- modernization of international roads;
- increase of traffic safety;
- quality improvement of the roads.

Similar policies are defined on the government, regional, or municipal basis for other industrial development. This is not a new phenomenon – such policies accompany the human activities for long times. What is new, compared to thirty years old standards, is an emphasis on the maximal *thriftiness* of the activities to the *environment*. This is of course motivated by positive impacts of such behavior, as the overall protection of the environment, sustainable use of the natural resources, a reduction of the environmental load, or an enhancement of the quality of the life. This requires a very distinct approach to be held already at time of planning.

Nowadays, any new big construction cannot be realized without precise treatment of impacts to the environment (negative as well as positive ones). In European Union, this is required by the Council Directive 85/337/EEC of 27 June 1985, on the assessment of the effects of certain public and private projects on the environment, with some later complements, and implemented by national rules. The process is divided into several phases; the most important one is the so-called *Environmental Impact Assessment* (EIA). The main purpose is to evaluate the (industrial or transport) construction in order to identify its negative impacts on the environments, to state if these impacts are acceptable (possibly compensated by positive benefits of the construction), and to propose some obligatory arrangements to diminish the load of the environment caused by the construction.

As an example, in Houda (2010) we presented an application of EIA to a highway construction and described thoroughly each of EIA categories applied to such construction. These categories are divided usually into two main classes:

- influences of the construction to the human healthy, and
- influences of the construction to the environment.

The first class covers air pollution factors, noise pollution, and social-economic ("comfort") factors. The second class covers air and climate impacts, water impacts, impacts on land and forests, impact on mineral and natural resources, impact on flora, fauna and ecosystems, impact on landscape, impact on systems of ecological stability, and impact on tangible property and cultural heritage. Every such class covers many inputs and outputs, some of them are

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very hardly quantifiable (like emotional factors or life conditions in the category of social-economic factors). Furthermore, many sources of *uncertain* nature can be identified, for example:

- future load of transport networks (traffic),
- efficiency of the proposed arrangements,
- subjective criteria,
- unpredictable accidents.

In our research we propose a quantitative methodology to deal with environmental tasks; it takes use of known modelling frameworks of stochastic optimization, namely probabilistic optimization methods.

2 Model Description

Consider a collection of possible arrangements which can be used to compensate for negative environmental impact of a construction. According to common conventions, the collection will be denoted $X \subset R^n$ and the arrangements (elements of X) by x. The nature of the components of x can be very manifold—from 0–1 variables (representing just on/off state of the arrangements) through discrete/integer values (variants of arrangements, equivalence and exclusion constraints), to the continuous variables (describing dimensions and quantities of the arrangements). The number of the variables (that is, n) and their nature will result without doubts in numerical limitations and would require some additional research in order to simplify the representation of the economic reality into a reasonable sized mathematical model.

A traditional representation of the uncertainty is through a variable $\xi \in \Xi$. The support $\Xi \subset R^n$ is usually referred as the *uncertainty set*, and is assumed to be fixed. In robust optimization, we generally do not require any additional information about ξ; the situation is different in our stochastic optimization approach which solely depends on complete knowledge of the probabilistic distribution of ξ—we assume that ξ is (continuous or discrete) random variable. Some examples of uncertainty sources were already presented in the previous section.

The actual expenses of the arrangements are represented by the cost function $c: X \times \Xi \to R: (x;\ \xi) \mapsto c(x;\xi)$. It is nonlinear and can depend on the uncertainty variable. As we concentrate on different kinds of uncertainty factors in the problem, we make a simplification here and define $c(x;\xi) \coloneqq c^T x$ (we drop the nonlinearity and explicit dependence of the costs on future uncertain factors); $c \in R^n$ denotes a fixed (non-random) unit cost vector. Apart from a traditional cost-minimizing optimization problem, in our approach we incorporate the cost function to the constraint part of the problem; to do this, we suppose a constant B representing a budget limit of the expenses. It is not hard to give back possible dependence into the inequality—we just proceed the same way as follows.

The factors of subjective and evaluative character are described by a utility function $u: X \times \Xi \to R^m$. We analyze the utility function in more detail in the following section.

We are now ready to formulate an *uncertain optimization problem* in the form

$$\text{minimize } u(c;\xi) \text{ subject to } c^T x\ \leq B, x \in X_0. \tag{1}$$

This formulation is more favorable to our view of the ecological policy as to obtain the best possible profit (utility). The only explicitly given constraints are represented by the cost constraint with budget limitation on the right-hand side. The set $X_0 \subset X$ covers for example 0-1 constraints, technical parameters or other deterministic constraints which are not explicitly specified here.

3 Stochastic Formulation of the Problem

The uncertain optimization problem (1) is not solvable in its present form due to the presence of uncertainty and the unknown form of the utility function. We will analyze both the issues in this section.

3.1 Indicators of Ecological Stability

As already noted above, the utility function is introduced in the context of representing a profit to the environment (and the humans) from ecological arrangements in large constructions which can be prescribed through the EIA process. The key idea of our approach is to replace a vaguely defined utility function by a set of well-defined quantities – indicators of ecological stability.

The indicators of ecological stability evaluate the quality of the environment in some specified area and are updated on a regular basis. The basic set is defined by the European Environmental Agency (EEA) Core Set of Indicators and includes such themes as air quality (for example: emissions of acidifying substances, emissions of ozone precursors,

etc.), biodiversity (number of bird species, protected areas, etc.), and many others. Some of the indicators (especially indicator of efficiency and total prosperity) are not yet standardized, and the number of proposed indicators grows as different studies make need of some not yet defined. These can be easily incorporated in our model if it would demonstrate the helpfulness.

Denote $g: X \times \Xi \to R^G: (x; \xi) \mapsto g(x;\ \xi)$ a function representing the values of EEA indicators; g is a vector function with values in a space of a dimension corresponding to the number of indicators in questions. Having in hand medium or long-term time series of the indicators, we can estimate the distribution of the values and potentially also their dependence on specific decision x. For example, the speed limits for vehicles on highways in urban areas have a provable influence on the overall noise level, and can be now even compared to historical datasets.

3.2 Weighting the Indicators

To replace the indeterminate utility function with indicators of ecological stability, it is still necessary to introduce a weighting scheme for these indicators. There are several possibilities to do this; in our paper we use a simple weighting approach based on a classical Allen's indifference curves (Allen, 1934). The indifference curves model the levels of equal utility, and we also enable the possibility of to compensate a lack in one indicator by an improved value in another one. In this setting, the utility function reads as

$$u(c; \xi) \coloneqq w^T g(x; \xi) \tag{2}$$

where w is some prescribed weighting vector, representing indicator (ecological) preferences; w also compensates for different measurement scales of the indicators.

3.3 Introducing probabilistic constraints

It is usually required that the indicators of ecological stability satisfy several limits, often imposed by legislative standard. In our settings (allowing for compensations), we state only one such limit (denoted by L in the sequel) being an aggregate limit value for the function given by (2). This is necessary to reformulate the problem (1) in terms of probabilistic programming: instead of dealing directly with the objective function in form (2), we move the expression (2) into constraints by requiring

$$w^T g(x; \xi) \geq L. \tag{3}$$

and maximizing the aggregate limit L, which is now considered as another decision variable (maximum imposable limit). Of course, the last step is to explore stochastic nature of the parameter ξ: we will require the constraint (3) to be satisfied with some, sufficiently high probability p (usually 0,95 or 0,99). The final optimization problem reads as

$$\text{maximize } L \text{ subject to } \Pr[w^T g(x; \xi) \geq L] \geq p,\ c^T x \leq B,\ x \in X_0. \tag{4}$$

This problem is known as the *optimization problem with a joint probabilistic constraint*, see e. g. Prékopa (1995, 2003) for thorough investigation of this class of the problem, including theory and survey of numerical algorithms to solve such problems. In Houda (2011), we provide an extension to this probabilistic problem, replacing sometimes complicated probabilistic constraints with a simpler expectation functional in the objective function.

It is possible to prohibit compensations of indicator values. In this case, we have an individual limit L_j for each indicator value $g\_j(x;\ \xi)$ and require the indicator values to satisfy the limits jointly. To complete objective values we take a weighted sum of indicators—denote thus $L \coloneqq \left(L_1, \ldots, L_J\right)^T$ a vector of the indicator limits, and complete the model with the formulation

$$\text{maximize } w^T L \text{ subject to } \Pr\left[g_j(x; \xi) \geq L_j\ \forall j\right] \geq p,\ c^T x \leq B,\ x \in X_0. \tag{5}$$

4 Results - Example

Suppose that the functional dependence of g on ξ is linear. In particular,

$$g(x; \xi) \coloneqq x^T A \xi, \tag{6}$$

the matrix A having deterministic coefficients. In Houda (2011), we have provided the following model. Suppose two indicators:

- percentage of area where the air pollution limits are exceeded, denoted by $1 - g_1$, and
- number of habitants exposed to heavy noise, denoted by $-g\_2$.

Furthermore, we suppose the dependence of both indicators on one uncertainty factor ξ, namely the random transport intensity on highway passing through the area in question. The possible arrangements are provided by

- imposed speed limit of 50 km/h (0-1 variable x_1),
- imposed speed limit of 80 km/h (0-1 variable x_2), and
- building noise wall of length x_3 (continuous variable).

The technical constraint $x_1 + x_2 \leq 1$ assures that only one of the speed limits offered is imposed. We assume the dependence of g_1, g_2 on ξ to be linear, namely,

$$\begin{aligned} g_1(x;\xi) &:= (a_{10} + a_{11}x_1 + a_{12}x_2)\xi \\ g_2(x;\xi) &:= (a_{20} + a_{21}x_1 + a_{22}x_2 + a_{23}x_3)\xi \end{aligned} \tag{7}$$

the coefficients a_{ij} represents the positive effects of the imposed speed limits to the air and noise pollution, respectively. Introducing weighting coefficients w_1, w_2 for every of the two indicators, the problem formulation of type (5) then reads as

$$\begin{gathered} \text{maximize } w_1L_1 + w_2L_2 \\ \text{subject to } \Pr\begin{bmatrix} (a_{10} + a_{11}x_1 + a_{12}x_2)\xi \geq L_1, \\ (a_{20} + a_{21}x_1 + a_{22}x_2 + a_{23}x_3)\xi \geq L_2 \end{bmatrix} \geq p, \\ c^T x \leq B,\ x_1 + x_2 \leq 1,\ x_1, x_2 \in \{0,1\}, x_3 \geq 0. \end{gathered} \tag{8}$$

The resulting optimization program is the linear stochastic programming mixed-integer problem with probabilistic constraints. If, in addition, we provide some additional assumptions on distribution of the random variable ξ (for example its normality), it is numerically solvable (see e. g. Cheng & Lisser, 2012; Houda & Lisser, 2014). In this paper, we will not go into the details of numerical computations of probabilistically constrained optimization problems – see the references above.

5 Conclusions

During the process of the Environmental Impact Assessment (EIA), various ecological measures are considered in order to discover the impacts of big industrial and transport constructions to the environment, and to provide recommendations to the investors to adjust the projects to meet the ecological requirements. Many of these measures depend on factors which are uncertain (random) by nature. We propose a methodology which deals with these uncertain factors; in particular, we formulate two stochastic programming problems which deal with the task to introduce ecological arrangements of the construction in order to diminish the impact of the construction to the environment.

Both proposed models (4), (5) follow our aim: to maximize the overall utility from introducing ecological arrangements, provided the total costs will not exceed the budget limit. The uncertainty is caught through a probability distribution of the uncertainty vector ξ and the constraints are required to be satisfied with sufficiently high probability. Under additional assumptions on the probability distribution of the random component of the problem, the proposed models are solvable with linear or nonlinear algorithms introduced in the literature.

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A Note on U-statistics

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Abstract*: In economic applications, we very often need to use any statistical test. Large area of the test statistics can be viewed as so-called U-statistics. The aim of this paper is to introduce the U-statistics and to study asymptotics of these statistics. The classical results on asymptotics for U-statistics usually suppose an independent sample. In fact, the condition of independence is very often violet in economic applications, so in the paper, we are interested in asymptotics both in case of independent and non-independent observations.*

Key words: U-statistics · Dependent Observations

JEL Classification: C13 · C14

1 Introduction

In many economic applications, we need to use some statistical tests. So, in fact, we use some asymptotics for our computed statistics. How does such a test work? From our data, we compute a test statistic. Under null hypothesis, we consider this statistic to have any distribution, then we look at the value of the statistic in our experiment and we decide (according to chosen p-value) if we reject our null hypothesis or not. So, it is easily seen, the correct result of our test depends on precise knowledge of behaviour of our statistic.

Usually, we do not know the distribution of the statistic precisely, we know a limit behaviour of our statistic – we suppose to know asymptotic distribution of our statistic. This asymptotic distribution is right-computed if all conditions of asymptotic theorems are satisfied.

Classical asymptotic theorems suppose observations to be independent, but it is well-known problem, that in many economic applications this assumption is violet. In such a case, we can not use classical results and it is necessary to use results for dependent observations.

In this paper, we focus on nonparametric tests. A wide class of nonparametric statistics forms a class of so-called U-statistics. U-statistics were introduced by Hoeffding in his paper from 1948 on A class of statistics with asymptotically normal distribution.

2 Results

At first, let us recall, the definition of U-statistics. Let $X_1, X_2, \dots, X_r$ be a random sample from unknown distribution. Now, let us suppose, that unknown parameter θ can be estimated (from our observation) by using of a known function h. We suppose that $h(\cdot)$ is an unbias estimator of θ, which depends on r parameters, where $r \leq n$, more precisely

$$\theta = E\, h(X_1, X_2, \dots, X_r).$$

To obtain a U-statistic, we suppose that the function h is permutation symmetric in its r arguments. Surely, there is no reason to lose any information. So, there is no reason to use only first r observations to estimate θ, if we already know n observations. This problem is solved by so-called *U-statistic with a kernel h*, which is defined as

$$U(X_1, X_2, \dots, X_n) = \frac{1}{\binom{n}{r}} \sum_{\{\{i_1, i_2, \dots, i_r\}:\ 1 \leq i_1 < i_2 < \dots < i_r \leq n\}} h(X_{i_1}, X_{i_2}, \dots, X_{i_r}),$$

where the sum is taken over all unordered subsets $\{i_1, i_2, \dots, i_r\}$ of r different integers chosen from $\{1, 2, \dots, n\}$. Why do we use such a formula? What is the idea of such a formula? It is only an arithmetic average of all possible results of $h(\cdot)$.

The function h is called a *kernel function*. Now, we can observe, that U-statistic is in fact only an arithmetic average of unbiased estimators for θ, everything is based on independent identically distributed random variables, then we can deduce that $U(\cdot)$ is an unbiased estimator of θ, too. Moreover, U is permutation symmetric and has smaller variance than $h(\cdot)$.

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Since, $U(\cdot)$ does not depend on an ordering of $\{X_1, X_2, \ldots, X_r\}$, we have

$$U(X_1, X_2, \ldots, X_n) = E(h(X_1, X_2, \ldots, X_r)|X_{(1)}, X_{(2)}, \ldots, X_{(n)}),$$

where $X_{(1)}, X_{(2)}, \ldots, X_{(n)}$ denote an ordered sample. More precisely, by $X_{(1)}$ we denote the smallest value of $(X_1, X_2, \ldots, X_r)$, $X_{(2)}$ is the smallest from the rest and so on, so we have $X_{(1)} \leq X_{(2)} \leq \cdots \leq X_{(n)}$.

From this equation, we can see that U is in fact a projection of *h*, so a variance of *U*-statistic *U* is less or equal to a variance of the original estimator *h*: var $U \leq$ var *h*.

Now, let us show that some of the very famous and very useful statistics are in fact U-statistics.

Example 1 *The simplest U-statistic of degree 1 is a sample mean:*

$$\frac{1}{n}\sum_{i=1}^{n} x_i$$

(in such a case a function h is an identity function).

Example 2 *If we put*

$$h(x_1, x_2) = \frac{1}{2}(x_1 - x_2)^2,$$

then the corresponding U-statistic is an estimator of var X_1 – a sample variance:

$$U = \frac{1}{\binom{n}{2}} \sum_{j=1}^{n} \sum_{i:\, i<j} \frac{1}{2}\left(X_i - X_j\right)^2 = \frac{1}{n-1} \sum_{i=1}^{n} (X_i - \bar{X})^2,$$

where $\bar{X} = (1/n) \sum_{i=1}^{n} X_i$

In the same way if we take a kernel $\frac{1}{2}(X_i - X_j)(Y_i - Y_j)$ (in a case of two samples), we obtain a sample covariance.

Example 3 *Kendall's Tau. Let us recall that two points P_1 and P_2 on the plane are said to be concordant if the line joining them has a positive slope and disconcordant if the slope is negative. Let F be the set of distribution functions of all absolutely continuous bivariate random vectors (X, Y). Then a measure of association between X and Y is a functional τ defined on F by*

$$\tau = P(P_1 \text{ and } P_2 \text{ are concordant}) - P(P_1 \text{ and } P_2 \text{ are disconcordant}),$$

where P_1 and P_2 are two independent points distributed as (X, Y).

Kendal l's Tau satisfies all the usual properties of a correlation. It takes values in the interval [−1; 1]*, if X and Y are independent, then it is equal to zero. Whenever Y = f (X) for some monotone function f then corresponding Kendall's Tau is equal to* ±1.

A kernel function h, we can define by

$$\begin{aligned} h(P_1, P_2) &= 1 \text{ if } P_1 \text{ and } P_2 \text{ are concordant,} \\ &= -1 \text{ if } P_1 \text{ and } P_2 \text{ are disconcordant,} \end{aligned}$$

Then $h(P_1, P_2) = \operatorname{sign}(X_1 - X_2)(Y_1 - Y_2)$ *and a U-statistic estimator of τ is*

$$\binom{n}{2}^{-1} \sum_{i,j} t(P_i, P_j).$$

Example 4 *The Wilcoxon one-sample statistic. Let us suppose $X_1, \ldots, X_n$ to be a random sample from an absolutely continuous distribution function F with a density f. Let R_i be a rank of $|X_i|$, it means that R_i denotes a position of $|X_i|$ if the observations $|X_k|, k \in \{1, \ldots, n\}$ are arranged in ascending order. If we need to test a symmetrization about zero of a distribution of X_1, we often use so-called Wilcoxon one sample rank statistic T^+:*

$$T^+ = \sum_{i:X_i>0} R_i.$$

The statistic T^+ is not a U-statistic, but we can write it as a linear combination of U-statistics. We can write:

$$\begin{aligned} T^+ &= \sum_{i=1}^{n} \mathbb{I}_{(X_i>0)} R_i \\ &= \sum_{i=1}^{n}\sum_{j=1}^{n} \mathbb{I}_{(X_i>0)}\, \mathbb{I}_{(|X_j|\le X_i)} \\ &= \sum_{i,j:i<j,i,j\in\{1,\dots,n\}} \left(\mathbb{I}_{(X_i>0)}\, \mathbb{I}_{(|X_j|\le X_i)} + \mathbb{I}_{(X_j>0)}\, \mathbb{I}_{(|X_i|\le X_j)}\right) + \sum_{i=1}^{n} \mathbb{I}_{(X_i>0)} \end{aligned}$$

Hence, if we take kernels $\psi(x_1, x_2)$ and $\phi(x)$ as defined bel low:

$$\begin{aligned} \psi(x_1, x_2) &= 1, \quad if\ \ x_1 + x_2 > 0 \\ &= 0, \quad otherwise, \end{aligned}$$

and

$$\begin{aligned} \phi(x) &= 1, \quad if\ \ x > 0 \\ &= 0, \quad otherwise, \end{aligned}$$

then

$$\begin{aligned} T^+ &= \sum_{i,j:i<j,i,j\in\{1,\dots,n\}} \psi(X_i, X_j) + \sum_{i=1}^{n} \phi(X_i) \\ &= \binom{n}{2} U_n^{(1)} + n U_n^{(2)}. \end{aligned}$$

Example 5 *Kolgomorov-type tests. Very often problem is to test the stochastic independence of two random variables X and Y. Let us suppose that F (x, y) is a distribution function of a pair (X, Y). Then we can define following statistic:*

$$D(x,y) = F(x,y) - F(x,\infty)\, F(\infty,y), \ \ for\ all\ (x,y).$$

To test the independence of X and Y, we use a hypothesis D(x, y) = 0. Hoeffding in his paper Hoeffding (1948b) considered a non-negative functional

$$\Delta(F) = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D^2(x,y)\, dF(x,y)$$

and used his U-statistic approach to formulate a test statistic for testing the nul l hypothesis of independence against general alternative hypothesis that $\Delta(F) > 0$. He defined $\psi(a,b,c) = \mathbb{I}_{(a\ge b)} - \mathbb{I}_{(b\ge c)}$ for $a, b, c \in \mathbb{R}$.

Then he considered the kernel of degree 5:

$$\gamma\big((x_1,y_1),\dots,(x_5,y_5)\big) = \frac{1}{4}\psi(x_1,x_2,x_3)\, \psi(x_1,x_4,x_5)\, \psi(y_1,y_2,y_3)\, \psi(y_1,y_4,y_5)$$

Surely, this kernel is not symmetric, so the related U-statistic must be defined as follows:

$$U_N = \frac{1}{n\ \cdot\ (n-1)\ \cdots\ (n-4)} \sum_{i_1,\dots,i_5\in\{1,\dots,N\}:i_l\ne i_k} \gamma\left(\left(X_{i_1}, Y_{i_1}\right),\dots,\left(X_{i_5}, Y_{i_5}\right)\right).$$

Under the hypothesis of independence, $\Delta(F) = 0$, hence its unbiased estimator U_N has also zero mean. Hoeffding also computed a variance of U_N, for more detail see Hoeffding (1948b) or Šidák, Sen, & Hájek (1999).

From these examples, we can see, that it is very useful to study U-statistics, really many widely-used test statistics can be viewed as U-statistics. To be able to do statistic tests, we need to know limit behaviours of these statistics. Classical results for asymptotics of these statistics are under condition of independent observations and go back to Hoeffding and others. Let us recall some of them.

At first, let us precise an assertion about the variance of U-statistics, see for example Theorem 1, Sub- chapter 1.3 in Lee 1990.

Theorem 1 *The functions in the form (conditional expectations)*

$$h_c(x_1,\dots,x_c) = E\left\{h(x_1,\dots,x_c,X_{c+1},\dots,X_k)\right\} \tag{1}$$

have following properties:

(i) $h_c(x_1,\dots,x_c) = E\{h_d(x_1,\dots,x_c,X_{c+1},\dots,X_d)\}$ *for* $c,d: 1 \le c < d \le k$,

(ii) $E(h_c(X_1,\dots,X_c)) = Eh(X_1,\dots,X_k)$.

The variance of the conditional expectations – $\sigma_c^2 = \mathrm{var}(\mathrm{h_c}(\mathrm{X_1},\dots,\mathrm{X_c}))$ – has also an interpretation as a covariance of each pairs $\mathrm{h_c}(\mathrm{X_{i_1}},\dots,\mathrm{X_{i_c}}), \mathrm{h_c}(\mathrm{X_{j_1}},\dots,\mathrm{X_{j_c}})$, where $\mathrm{i_1},\dots,\mathrm{i_c},\mathrm{j_1},\dots,\mathrm{j_c} \in \{1,\dots,\mathrm{n}\}$,

$$\sigma_c^2 = \mathrm{cov}\left(h_c(X_{i_1},\dots,X_{i_c}), h_c(X_{j_1},\dots,X_{j_c})\right).$$

This can be formulated as follows, see Theorem 2, subchapter 1.3 in Lee (1990).

Theorem 2 *An alternative expression for* σ_c^2 *is*

$$\sigma_c^2 = \mathrm{cov}\left(h_c(X_{i_1},\dots,X_{i_c}), h_c(X_{j_1},\dots,X_{j_c})\right),$$

where $\mathrm{i_1},\dots,\mathrm{i_c},\mathrm{j_1},\dots,\mathrm{j_c} \in \{1,\dots,\mathrm{n}\}$.

The last note to the variance of U-statistics shows, that it can be developed in terms of the quantities σ_c^2 see Theorem 3, Subchapter 1.3 in Lee (1990).

Theorem 3 *Let* U_n *be a U-statistic with a kernel h of a degree k. Then*

$$var\ U_n = \binom{n}{k}^{-1} \sum_{c=1}^{k} \binom{k}{c}\binom{n-k}{k-c}\sigma_c^2.$$

A classical approach how to prove an asymptotic of any sequence is to write the terms of this sequence in a form: $T_n = S_n + (S_n - T_n)$, where we know the asymptotics of (S_n) and $(S_n - T_n)$ is negligible. From this idea came the principle of the U-statistics decomposition.

The asymptotic normality of a sequence of U-statistics, in case that $n \to \infty$ and kernels remain fixed, can be established by the projection method. The projection of $U - \theta$ onto the set of all statistics of the form $\sum_{i=1}^{n} g_i(X_i)$ is given by

$$\widehat{U} = \sum_{i=1}^{n} E(U - \theta | X_i) = \frac{r}{n}\sum_{i=1}^{n} h_1(X_i), \tag{2}$$

where the function h_1 is:

$$h_1(x) = Eh(x, X_2, \dots, X_r) - \theta.$$

The first equality in the formula (2) is the Hájek projection principle. The second equality can be shown by some calculation, see for example van der Vaart (2007). From the equation (2), it is easily seen that for independent identically distributed random variables, $\widehat{U}$ is asymptotically normal by the central limit theorem provided $Eh_1^2(X_1) < \infty$. It is possible to show, that the difference between $U - \theta$ and its projection is asymptotically negligible.

The Hájek projection is a started point to very famous and widely used Hoeffding decomposition. To show Hoeffding decomposition we need to introduce following notation for kernels $h^{(1)},\dots,h^{(k)}$ of degrees 1, . . . , *k*. These kernels are defined recursively as follows

$$h^{(1)}(x_1) = h_1(x_1) - \theta$$

and

$$h^{(c)}(x_1, x_2, \dots, x_c) = h_c(x_1, x_{12}, \dots, x_c) - \sum_{j=1}^{c-1}\sum_{i_1,\dots,i_j \in \{1,\dots,c\}} h^{(j)}\left(x_{i_1}, x_{i_2}, \dots, x_{i_j}\right) - \theta \tag{3}$$

for *c* = 2, 3, …, *k*

Now, we can formulate following theorem, see, for example Theorem 1, Subchapter 1.6 in Lee (1990).

Theorem 4 *For j* = 1, 2, . . . , *k, let* $H_n^{(j)}$ *be the U-statistic based on the kernel* $h^{(j)}$ *defined by (3). Then*

$$U_n = \theta + \sum_{j=1}^{k}\binom{k}{j} H_n^{(j)} \tag{4}$$

The decomposition (4) is called *H*-decomposition, it is named after its inventor Hoeffding. The main usefulness lies in the fact that the terms $H_n^{(j)}$ are uncorrelated, with variances of decreasing order in *n*. Note also that terms of the decomposition (4) can be written as U-statistics of order *j*.

The basic result on asymptotic normality of U-statistics based on independent identically distributed random variables comes from Hoeffding (1948a), see also Theorem 1, Subchapter 3.1 in Lee 1990.

Theorem 5 *Let* $\sigma_1^2 > 0$. *Then* $\sqrt{n}(U_n - \theta)$ *is asymptotically normal with zero mean and asymptotic variance* $k^2\sigma_1^2$.

The proof of this theorem is based on the H-decomposition. This theorem can be also formulated in multivariate version without any extra changes. Surely, there exist many other results on asymptotics for U-statistics – estimation of rates of convergence, law of iterated logarithm, laws of large numbers, convergence of empirical U-process and many others, see for example Lee (1990).

Now, let us focus on the problem of non-independent observation. It is very often problem in practical economic usage. Surely, this problem is very old, so there are many results for dependent observations, too. Many of these results are under so-called mixing conditions, see for example Denker & Keller (1983), Arcones & Yu (1994) and Borovková et al. (2001). Mixing conditions are very well studied in, for example, Bradley (2007). It covers really huge part of these problems. On the other hand, the mixing conditions are very technical difficult and quite difficult to verify them. It is a reason, why we are interested in results for U-statistics based on stationary processes in this paper. One of the most interesting result, was given by Hsing & Wu (2004).

In the following, we suppose h to be a symmetric kernel of degree 2. Let us suppose $(\epsilon_i)_{i\in\mathbb{Z}}$ to be i.i.d. random variables taking values in a general state space. Let Z_i be a shift process: $Z_i = (\dots, \epsilon_{i-1}, \epsilon_i)$ and let $h(X_i,\ X_{i-k}) - Eh(X_i,\ X_{i-k}) \in \sigma(Z_{i\vee i-k})$. Then we can define a projection operator P_i for any integrable random variable X as

$$P_i X = E(X|Z_i) - E(X|Z_{i-1}).$$

The following theorem was stated by Hsing & Wu, see Theorem 1, Hsing & Wu (2004). In this theorem, there are weights supposed to be summable.

Theorem 6 *Assume that*

$$\sum_{k=0}^{\infty}\sum_{i=0}^{\infty}|w_k|\left\|P_0\big(h(X_i,X_{i-k}) - Eh(X_i,X_{i-k})\big)\right\|_2 < \infty.$$

Then

$$\frac{1}{\sqrt{n}}\sum_{1\le i,j\le n} w_{i-j}\Big(h\big(X_i,X_j\big) - Eh\big(X_i,X_j\big)\Big) \longrightarrow \mathcal{N}(0,\sigma^2)$$

in distribution for some $\sigma^2 < \infty$.

The proof of this theorem is based on a method which is similar to Hoeffding decomposition and allows us to approximate our process by strictly stationary process for which we know its limit behaviour. In their paper, Hsing and Wu also stated the more important result in case of non-summable weights; see Theorem 3 in Hsing & Wu 2004.

Theorem 7 *Assume that* $\sum_{k=0}^{\infty}|w_k| = \infty$, $\sum_{k=0}^{\infty}(n-k)|w_k^2| = o(nW_n^2)$, *where*

$$W_n = \sqrt{\sum_{i=1}^{n} W_n^2\,(i)/n}\,, \qquad \textit{with}\ \ W_n(i) = \sum_{j=1}^{n} w_{i-j},$$

$\liminf_{n\to\infty} W_n/(\sum_{i=1}^{n}|w_i|) > 0$ *and*

$$\lim_{l\to\infty}\sup_{j\in\mathbb{Z}}\left\|h\big(X_i,X_j\big) - Eh\big(X_1,X_j\big) - \overline{\Big(h\big(X_1,X_j\big) - Eh\big(X_1,X_j\big)\Big)}^{l}\right\|_2 = 0,$$

Where $\bar{X}^l$ *denotes a projection of X onto a space generated by l of* (ϵ_i). *Then*

$$\frac{1}{\sqrt{nW_N^2}}\sum_{1\le i,j\le n} w_{i-j}\Big(h\big(X_i,X_j\big) - Eh\big(X_i,X_j\big)\Big) \longrightarrow \mathcal{N}(0,\sigma^2)$$

in distribution for some $\sigma^2 < \infty$.

The proof of this theorem is based on approximation by m-dependent processes.

One of the more general results was given recently by Lévy-Leduc et al., see Lévy-Leduc (2011). They obtained the convergence of empirical U-process. Unfortunately, it is not possible to present the result here, because it is very technical and it need many technical notation.

Different approach to asymptotics for U-statistics based on dependent observation are developed by Leucht and others, see for example Leucht (2012) and Leucht & Neumann (2013).

3 Conclusion

In this paper, we introduced the basic facts about U-statistics and also their main usage. We showed, that many of wide-used statistics are in fact U-statistics. We also presented some classical results on asymptotics for independent samples and then we discussed and showed some results for a case of weakly dependent observations.

Acknowledgement

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Session 6

Managerial Decision Making and Change Management

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Food and Nutrient Security: Model of Decision Making under Information Uncertainty

Renata Hrubá[1]

Abstract*: Decision-making under uncertainty continues to be an active area for research, with political implications within the food industry, particularly in the EU. However, these attitudes and behavior patterns are not specific to the current situation. Following the integration of attitudes into a model, more rational decision-making has been increasingly used. The aim of this study was to survey: How attitudes toward food and nutrient security influence decision making under unclear information. A questionnaire collected data from 910 students in the Czech Republic. An ordered regression model was developed for ordinal dependencies as well as independent variables. The model used for this survey estimated the attitude spillover-effect on behavior under information uncertainty. It is evident from the survey that clear information and awareness of global issues related to food are needed. Changing human behavior is not about knowledge, but rather about the opportunity to make significant alterations in human thinking. This data may guide the critical issues concerning clear information on food origin within the Czech Republic for a project from the European Union.*

Key words: Perceived Uncertainty · Decision-Making · Attitudes · Spillovers Effect

JEL Classification: D12 · D71· D81

1 Introduction

Incorporating cognition, attitudes in consumer decision-making behavior still remains an unclear area of research with political implication upon the food industry. While there are several reasons for a revision of the neo-classical rational theory, we focus expansive research on attitudinal and behavioral patterns consistent with the hypothesis attitudes to food and nutrient security which have had a significantly larger impact on decision making under information uncertainty. Most studies provide evidence that attitudes toward food and nutrient security influence consumer behavior, both in Europe (Grunert, 2005; Verbeke, 2005; Vermeier & Verbeke 2006) and in the context of less developed countries (Bosman at all. 2012). Several experiments demonstrate even stronger evidence that attitudes have an impact on decision-making behavior (Robinson & Smith, 2002; Zepeda & Leviten-Reid, 2004; Bell & Marschal, 2003; Chen & Huang, 2013). These revisions of theory suggest integrated attitudes into a model of rational decision-making behavior. Or, as Li at all. (2013) concludes, that the effects of cognition and emotion varies with the levels of uncertainty to a decision-making behavior, specifically in China. In fact, a series of findings indicate that the prominent position of decision-making under uncertainty has an emotional influence. Hence, the aim of this study is associated with research question: How attitudes toward food and nutrient security influence decision making under unclear information. The European Union established a project to examine relevant issues impacting the agro food sector. The objective includes mapping the current situation and producing guidelines on critical issues concerning clear information on food origin. In order to achieve a comprehensive picture of the situation in the Czech Republic, a questionnaire is consistent on prediction behavior patterns under information uncertainty with different levels of attitudes on food and nutrient security.

1.1 Types of information

Information types are considered using the typology of search, experience (Nelson, 1970; Stigler, 1961) and credence (Darby & Karni, 1973) in the literature on information economics. Search characteristics are those that can be recognized before purchase. Experienced characteristics can be ascertained after purchase. Credence characteristics not detected at all, even after using the product (Andersen, 1994). Is not at all clear what other information consumers find on values derived from what they get. To solve that issue conceptually, Becker & Tilman (2000) distinguished between product characteristics and product attributes. The information concerning product attributes consumers have during shopping and consumption refers as cue. The other approach, mostly purchases made under uncertain quality is divided among intrinsic and extrinsic cues. Intrinsic may include any food characteristics inherent in the product itself, whereas extrinsic cue is not fundamental to the product. Studies have often shown that cue has both an direct and indirect effect on attitude (Van der Lans et all., 2001). The most reported is an indirect effect on consumer attitude towards a product,

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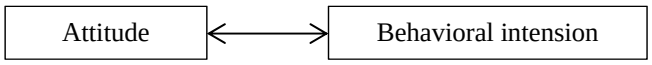
such as locally-grown, fresher, environmental issues and safety. In conclusion, this approach provides guidelines on the critical issue of information on decision-making behavior. Recent research suggests that cue significantly reduces information uncertainty when consumers feel confident about them. But Cox (1967) pointed out that, in the current situation on the market, consumers feel confident in using cues they believe to predict quality, even though they are not clear.

1.2 Decision-making: Attitude and intention

The behavior model introduced by the theory of attitude formation serves as the basis for a conceptual framework to investigate the specific effects from attitudes varying with the level of the behavior of consumers, where there is information uncertainty (see Figure 1). Numerous studies employing this method have been reported in the food market (Vermeir & Verbeke, 2006; Denton, 2009; Chen & Huang, 2013). The theory of attitude formation was developed in psychology (Fishbein, 1967; Fishbein & Ajzen, 1975).

Figure 1 Conceptual framework used to investigate the specific effects from attitudes varying with the level of uncertainty



Source: Fishbein & Ajzen, (1967, 1975)

2 Methods

2.1 Data collection

The questionnaire based on research by Consumer Interest Alliance Inc. (2007) and was developed by a focus group. The questionnaire was collected at the Universities (330 from University of Czech Life Science in Prague, 300 from University of South Bohemia in České Budějovice, 340 from Mendel University in Brno, 200 from Masaryk University, 200 from School college in České Budějovice, 80 from School college in Benešov). For the purpose of survey was used part of responds. All respondents were responsible for cheese purchase. The sample is not statistically representative of younger and better educated students among the Czech population. A survey was developing to collect attitudinal and behavioral patterns under information uncertainty.

Each respondent was asked (a) when are you selecting a new cheese product, do you generally, purchase a product if the information on the product label is not easy to understand? The consumer scored on a level using four choices – one being never, the second rarely, third sometimes and four always; (b) to the question of how important is the following information to you? For each cue (1) Origin of milk; (2) Safe food handling, (3) Ingredients), the student scored level 1 being unimportant, 2 important and 3 very important.

Consumer attitude (e.g. interest in cue) was measured by assessing “importance to you” (Table 1). Importance was measured on a 3-point rating scale. Intention of behavior was measured on a 4-point interval rating frequency of behavior. The first indications pertained to origin: the milk of origin as part of the phase of the regulation EU No 1151/2012 of the European parliament and of the Council on quality schemes for agricultural products and foodstuff to improve the authenticity of local product. The next included ingredients in products and safe food handling, which are mandatory government-regulated and standard information cues. Safety is one of the food product attributes that can be used by consumers in their evaluation of product alternatives and their formation of quality expectations, argues Verbeke (2005). The analysis was first focused on the cue, then on behavior intention.

2.2 Description of the model

Students scaled their level or frequent decision-making under unclear information. Let *Yi* denoted the intention of behavior “i” letting i=0 meaning never buy, option 1 meaning rarely, 2 sometimes and 3 always. Note that the purpose of this numeric does not have unit measurement, and that expectations, etc. are not included. Furthermore, the model for multi-numerical data is inefficient, since they ignore the ordering information. The linear regression model cannot be appropriate either, due to the implicit assumption of an interval scale, as pointed out by Winkelmann & Boes (2006). While we introduce econometric models that take into account ordered responses, we consequently use ordered probit regressions to explore the relationship between decision-making information uncertainty and human thinking concerning food and nutrient security. There are several models for ordinal outcomes, which are used in micro-economic theory. The model for ordered dependent variables are an underlying continuum by latent variable *Yi** using the structural model as shown in Eg. 1.

$$Yi^* = x'_i\beta + \varepsilon_i, \quad (1)$$

The vector x'_i is a set of K covariates that are assumed to be strictly independent of ε_i, β a vector of K parameters. Where ε has mean zero and follows a symmetric distribution (i.e., normal).. We cannot observe the latent continuous variable Yi^*, with discreet values. Since the score is an ordered ranking but still a binary measure, the equivalence is based on the following relationship between the observed discrete response and the continuous latent variable Yi^* is observed in discrete form through a censoring mechanism (Greene & Hensher, 2008). The predicted probability of a behavior is the area under the function between a part of cut points as given frequency of the behavior.

The marginal effect is at the point between the start and finish of the function. The model is estimated using probit analysis to control for different effects and to examine the attitudes and behaviors patterns. The basic form of the model is: Buy, if information is uncertain = *f* (attitudes to information as a cue on new products).

First, we estimated the linear function of the behavior as independent variables and a set of cut-points. The cutpoints are coded κ_0, κ_1, κ_2. We used each attitude on information to predict the behavior as an ordinal independent variable, defined simply as a set of mutually exclusive states that are ordered in terms of the characteristic of interest. We will attempt to draw focus to an attitude concerning in food and nutrient security such as predictors of the models. We tested whether attitudes are significant and fit of measure.

Second, we focus on predicting human behavior under information uncertainty, with to differentiation of attitudes on food and nutrient security. In the ordered probity regression model, the probability of a particular outcome is determined by the area under the density function between relevant thresholds. This means that the probability of behavior corresponds to the probability that the estimated linear function, plus random error, is within the area of the cutpoints estimated for the variation of behavior (Eg. 2), where $F()$ is standards normal distribution $F(u) = \Phi(u)$. The model provides predictors of each level of behavior for the low attitudes of food and nutrient security for our purpose only unimportant level of attitude. Hence, the discrete probability effect for all level of attitudes is defined Eg. (2). Following the distributional assumption at the error terms yields the conditional possibility function of the latent variable, $f(Y_i=j/Xi)$.

$$P(Y_i=j\backslash x_j) \begin{cases} 0 \Rightarrow \text{never buy if } Pr(y=0) = F(\kappa_0 - X_i\beta;\ (y^* \leq -0{,}82) \\ 1 \Rightarrow \text{rarely buy if } Pr(y=1) = F(\kappa_1 - X\beta) - F(\kappa_0 - {}_{Xi}\beta);\ (-0{,}82 \leq y^* \leq 0{,}13) \\ 2 \Rightarrow \text{sometimes buy if } Pr(y=2) = F(\kappa_2 - X_i\beta) - F(\kappa_1 - X_i\beta);\ (0{,}13 \leq y^* \leq 1{,}60) \\ 3 \Rightarrow \text{always buy if } Pr(y=3) = 1 - F(\kappa_2 - X\beta);\ (y^* \leq 1{,}60) \end{cases} \quad (2)$$

Third, the data analyst probability should search for an elegant and concise method. When approximately linear, the marginal effect can used to summarize the effect of changes in attitude toward food and nutrient security on the probability of each level of behavior. The marginal probability effect (*MPE*) of the l-th element in x_i (Eg.3) and can be obtained in general form from equation (2), by taking firs derivatives, as stated by Winkelmann and Boes (2006). We compare the probability for low level of attitudes with marginal probability effect.

$$MPE_{ijl} = \partial \Pi_{ij} / \partial x_{ij} = [f(\kappa_{j-1} - X'_i\beta) - f\,\kappa_j - X'_i\beta]\,\beta_l \quad (3)$$

3 Research results

More than 910 questionnaires were distributed in fall 2009 and all were returned. Probably due to first sentences in the part of introduction: Cheese imports reached 64 277 tones in 2009 which represent 42.8% share in consumption. Before answering the entire questionnaire we introduce them about the purpose of survey and then we ask to eat cheeses pending. Subsequently questionnaire were framed into electronic formulas (in google) and used to analyze data in statistics program. In the second part of survey was presented the Common Agriculture policy at the secondary school. From analysis we used only 910 data from the University. Of the 910 youngsters following higher education in the age group 20 -24, 595 were female (65%). Data analysis methods included ordered probit models. First, we tested whether attitudes toward cues influenced behavior. Students who have positive attitudes toward global issues focused on milk origin, safe food handling and ingredients in the product. They tended to be associated with a high level of uncertainty to buy a new product ($p<0.10$).

Mean intention for buying a new cheese product if the information on the product label was not clear was 1.09 on a 4-point scale. Mean attitude toward ingredients in the product was 1.12, while mean attitude toward safe food handling was 0.83 and origin of milk was 0.78, all on a 3-point scale. Majorities of consumers have either a high attitude towards global food issues and high levels of decision making under uncertainty or low attitudes towards global issues and low levels of uncertainty, in line with consumer behavior. However, also a considerable amount of students have

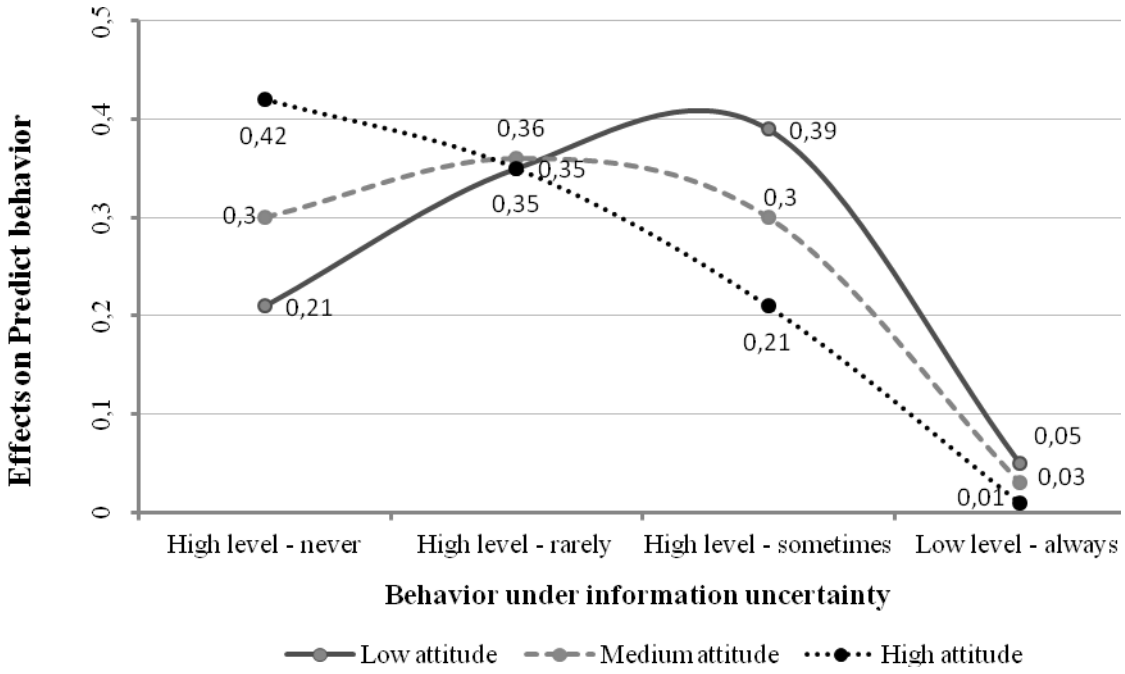
high level decision making under clear information (only *n*= 30; 3.3% buy the product with unclear information). In the ordered probity model, the Cut of Points were estimated as *cut1* = -0.81, *cut2* = 0.13 and *cut3* = 1.61. Subsequently, the effects on marginal predicted behavior for such attitudes were estimated by a statistic program (Figures 2). The value of marginal effect of behavior under information uncertainty screened ranged from high levels of behavior intention under information uncertainty to low levels indifferent to information. From this data, we could analyze attitudes toward food and nutrient security, as well as behavior patterns. First we estimated the probabilities for students with high attitudes toward global issues. To illustrate the marginal value of change behavior, the probabilities are shown in Figure 2. The result clearly shows that students differentiate among the level of decision-making under uncertainty. As expected, to be interested in food and nutrient security has a very high probability of never buying (or rarely buying) under unclear information, as seen from the fact that it is a 77% probability. Those cues (milk of origin, ingredients, safe food handling) directly address real or perceived challenges on food and nutrition security in the EU agro-food sector. In addition, the predictions made showed 95% of young people with uncertainty concerning product information will (never, occasionally or sometimes) buy such food products. Students are unlikely to ever buy a product with unclear information. The analysis also shows clear information and consumer vision of food safety and security. Likewise some studies have found that 91% of consumers are used to reading labels before or during their purchase (Rodríquez et. al, 2006). Probability was also associated with differences by interest in all cues. The effect of strong interest is initially positive. As attitudes increase from negative, more cases from the category of buying products with unclear information (-sometimes) move into the category never buy with unclear information than move from rarely buy with unclear information. With decreasing attitude, more cases leave the behavior intention to never buy the product with unclear information (from 42% to 21%) than sometimes buy the product (from 21% to 39%), resulting in a smaller probability.

In other words, changes of attitude have a higher effect on probability in the buy product with clear information category than in sometimes and never. We estimated the attitude spillover effect in the form of a move from the probability category of buying product with unclear information (- sometimes) into the category of buying the product with clear information. Findings from this survey may aid policies in their development and implementation of a transparent system for clear information concerning food origin. Second, the effect of medium and low interest is negative and then positive. At the end of our analysis, being unclear about information for milk of origin or ingredients or safe, healthy food produces a very high probability of never or rarely buying (56%) (in the level of unimportant). On the other hand, the probability in levels behavior is similar, as the level of important increases the probability from 21% as unimportant and the probability form 42% as very important.

This is the first detailed survey of the attitudes and behavior patterns under information uncertainty in the Czech Republic. The result reported using ordered model significant relationship between attitudes and behavior. This is of particular relevance. In addition microbiological quality and food security give couples the opportunity to make informed decision making. The general is that there is sufficient evidence to support clear information related to food in all the supply chain system. This reflects number of research findings. Some important sources of information about antimicrobial resistance, which are occurring in food, come from researchers in veterinary and human medicine. Their experiment is focused on mehthyl-resistant Staphylococcus aureus (MRSA) and extended-spectrum beta-lactamases. In the last decades has been proven, that the bacteria can affect both animal and human dermatitis, arthritis, pneumonia etc. The study shows, why is attention to strategies ensuring antimicrobials resistance along the food chain, why accepted complex solution in the countries not only in European Union is. Analysis of regulation on imported food in the microbiological quality shows that it is affected at the least two requirements of food control. At the time prevailing consensus option, that one of these requirements is related to food hygiene, the second is related to food related diseases. Method of controlling the requirement is not possible to simply identify if we require the interpretation from the Federal Ministry of Food and Agriculture in the Germany. The strict requirements regarding food apply in the whole of Germany as well as in the European Union. It applies, that microbiological quality is various across country. The increasing awareness of consumers on food security and the potential risk associated with food production and technologies people are more interested in issues of local region, local producers (Henson, 1996) Additionally, people are afraid to use chemicals in food production as well as in their local area (Tilmany at all., 2008). This is a reason why uncertainty and perceived difficulty in evaluating quality increases consumer use of extrinsic the quality cue (Bredahl, 2004; Verbeke, 2005; Zeithaml, 1988) and changes behavior. As compare with many other studies, the traceability system plays a key role in purchase intentions (Chen & Huang, 2013). Chen, Huang focused on the relationship between perceived uncertainty and purchase intention to consume fast foods, offered by stores adopting the Food Traceability System in Taiwan. They reported that when a fast food store adopts the Food Traceability System, then realized that uncertainty can be reduced, because both their perceived information asymmetry and fears of seller-opportunism are also reduced, thereby strengthening their purchase intentions. It is evident from the survey that clear information and awareness of global

issue related to food are needed. Changing human behavior is not about knowledge, but rather about the opportunity to make significant alterations in human thinking.

Figure 2 Marginal effects of attitudes on decision-making under uncertainty



Source: Own processing (2012)

4 Conclusions

In this article, we have estimated probability model where marginal change attitudes affect purchase decision - making under information uncertainty. The model used for this survey estimated the attitude spillover-effect on behavior under information uncertainty. However, some conclusions can be drawn regarding factors that might impact on behavior, as determined by the various level of attitude. Some clear relationships are evident from probability analysis, most notably that different attitude of microbiological and food security. It is difficult to ascribe effect to these relationships. However, higher attitude increase probability in category to never buy at the same time decrease probability in the category rarely to buy. A questionnaire collected data from 910 students in the Czech Republic. Significant relationships exist. Attitude to information change has both an explanatory and a predictive function of attitude change has then been related to a change in the direction of demand for quality (environmental, as well as sustainability) foods. Therefore we would concluding of the change in attitudes had contributed to our understanding of the increase in demand. These data may guide the critical issues concerning clear information on food origin in the Czech Republic for project from European Union. It is likely to have another though that uncertainty is in the minds and souls of the customer and a kind of analysis offered here is more suitable for reliability study. Although this viewpoint cannot be refuted in totality, this analysis based on the scientific principles of probability, have greater extent of validity.

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Functionality and Importance of Processes of Small and Medium-sized Enterprises

Vlasta Doležalová, Petr Řehoř[1]

Abstract*: The process management is an important part for enterprises, therefore, it is very promoted and referred in the business management. Essential part of the process management is the human resource management process, therefore, this paper focuses on this important area. The aim of this paper is to analyse the process management in small and medium-sized enterprises in the South Bohemian Region of the Czech Republic. The paper is focused on basic characteristics of sample of enterprises, furter functionality and importance of processes in microenterprises, small enterprises and medium-sized enterprises. Followed by a focuse on Human resource management process, its functionality and importance according to the categorisation the same enterprises. Data were collected by using a questionnaire and interviews with representatives (owners and manager)s of enterprises in the South Bohemian Region during 2013, with the support of the GAJU 039/2013/S grant project, entitled: „Human Resource Management of Small and Medium-sized Enterpises.“*

Key words: Processes · Human Resource Management · Functionality · Importance · Small and Medium-Sized Enterprises

JEL Classification: O15 · J24 · L2

1 Introduction

Every company wants to improve the way it does business, to produce goods and services more efficiently, and to increase profits. Nonprofit organizations are also concerned with efficiency, productivity, and with achieving the goals they set for themselves. Every manager understands that achieving these goals is part of his or her job. Business process management (or BPM) is what they call these activities that companies perform in order to improve and adapt processes that will help improve the way they do businness (Harmon, 2010). Business processes are the production lines of the new economy. When they fail us, our products and services fail our custormers, and our business fails its owners. The more businesses change, the more they must concern themselves with thier stakeholder relationships and manage their processes so that technologies and organization designs have a common business purpose (Burlton, 2001). Since the key process that is specific to processes is the derived support that supports key processes, support processes are more general in nature. These provide the conditions for the functioning of the other processes. They ensure that the organisation is able to provide products and services necessary for the security of their functionality. Managing processes determine and ensure the development and management of organisational performance and create the conditions for the functioning of the other processes that ensure the integrity and functioning of the organisation. These are the processes of strategic and operational-tactical importance, which ensure that the organizsation will create and provede quality products and serices. Part of the monitoring and adjusting processes is the information system that must not be static and must be supportive.

Human resource management can be defined, according to Armstrong (2006), as a strategic and logically thought attitude towards managing the most precious commodity an organisation has – its employees – who individually and collectively contribute to achieving company goals. According to Graham & Bennett (1992), the goal of managing human resources is to achieve the highest possible benefit from the work, skills and capacity of company employees (its human resources) and, at the same time, to ensure that employees gain material and psychological rewards for their work. Human resource management includes anything and everything associated with the management of employment relations in the firm. We do not associate human resource management solely with a high-commitent model of labour management or with any particular ideology or style of management. High-commitment strategies do exist, but we are also concerned with the many cases in which managemnet is pursuing performance goals through lower levels of attachment or is seeking to manage a complex, segmented workforce through variable levels of commitent (Boxal, 1996, Purcell, 1996).

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The impact of human resource management policies and practices on firm performance is an important topic in the fields of human resource management, industrial relations and industrial and organisational psychology (Boudreau, 1991, Jones & Wright, 1992, Kleiner, 1990).

2 Methods

Primary data were obtained through a questionnaire and interviews of 300 representatives (owners and managers) of small and medium-sized enterprises in the South Bohemian Region of the Czech Republic. The survey which took place in 2013 focused on the characteristics of the surveyed enterprises and their human resource management strategies, evaluation of individual processes according to their improtance and the functionality of the usage of the importance. The function of the human resource management utilised in each company was specific as a level of the indicators in human resources management. For clarity of information, this paper is focused on the fundamental characteristics of enterprises, namely the distribution by the number of employees. The enterprises are categorised according to the number of employees:

- micro enterprises (1 – 9 employees),
- small enterprises (10 – 49 employees),
- medium enterprises (50 – 249 enterprises).

The following is focus on the evaluation of Process Management, specifically the importance and fuction of key processes throughout the sample of businesses, and a further analysis of this area, focused on the categorisation of companies according to micro enterprises, small enterprises and medium enterprises. The lis of key processes is evaluated as follows:

- Marketing,
- Production and providing services,
- Financial management,
- Human resource management,
- Quality management,
- Information transfer processes,
- Corporate social responsibility,
- Communication with the public.

The survey is focus on process of Human resource management, selected to most frequently used areas:

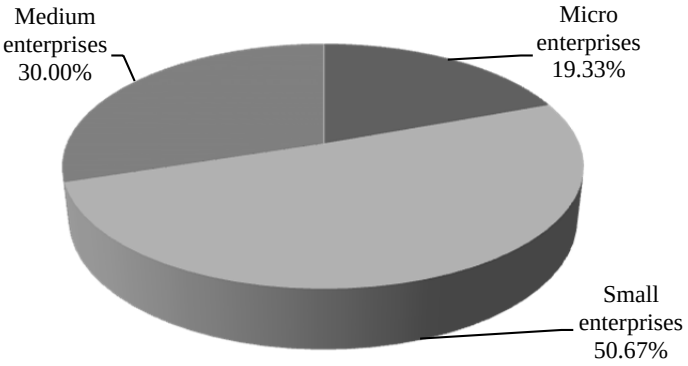
- Planning of employees,
- Recruitment,
- Development and education,
- Remuneration for employees,
- Employee evaluation,
- Communication with employees,
- Satisfaction of employees,
- Corporate culture.

The aim of this paper is to analyse the process management in small and medium-sized enterprises in the South Bohemian Region of the Czech Republic with focuse on basic characteristics of sample of enterprises, furter functionality and importance of processes in microenterprises, small enterprises and medium-sized enterprises. Followed by a focuse on Human resource management process, its functionality and importance according to the categorisation the same enterprises.

3 Research results

The questionnaire was completed by 300 enterprises from South Bohemia in the Czech Republic. Figure 1 shows that the largest component of the companies by employee number is that of small businesses employing 10 to 49 (52.33%), followed by medium-sized enterprises with the level of the operator of 50 to 249 (29.33%) and the micro enterprises employing 1 – 9 (29.33%).

Figure 1 Distribution of enterprises by number of employees

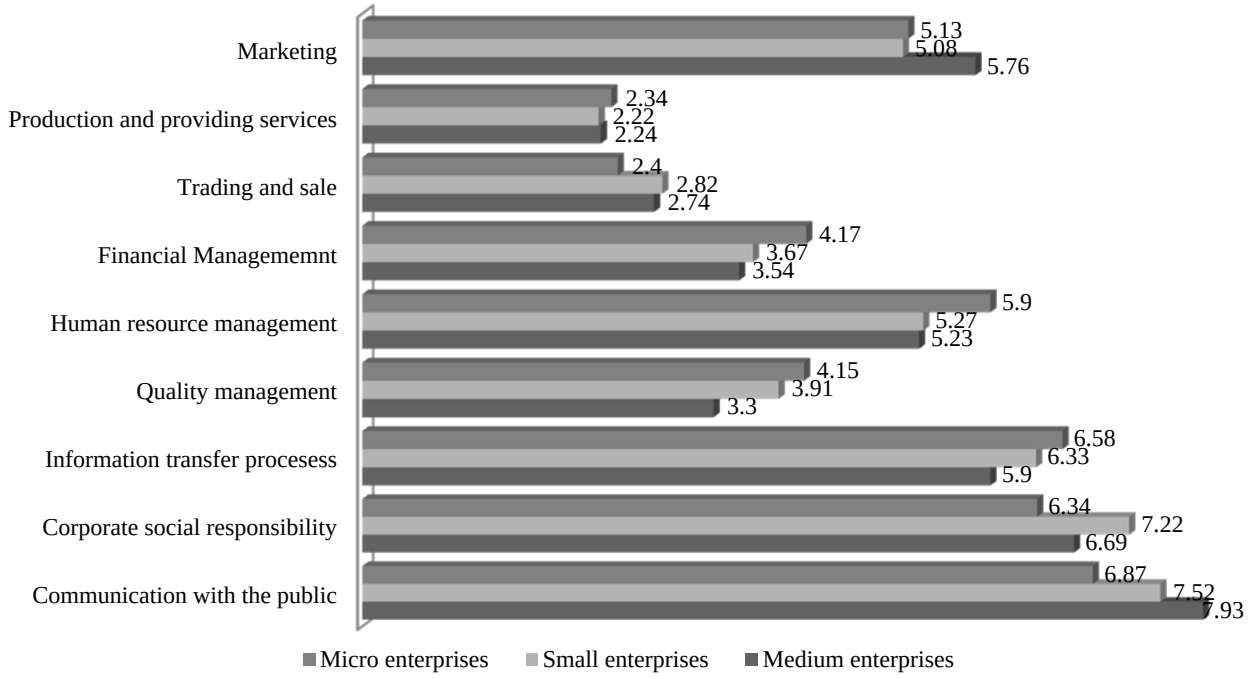


Source: Own processing

The survey also focused on the evaluation processes in enterprises. Owners and managers of a sample of enterprises presented the importance and functionality of the various processes in enterprises. Owners and managers of enterprises from South Bohemia in the Czech Republic reviewed the various processes in order of importance, at levels of 1 to 9 (integers), with a list that reviewed processes for each undertaking separately. Evaluation of importance by an enterprise as level 1 means the most important process in the company, while the value of 9 is equal to the least important process, selected from a list of 9 evaluated processes. In practice, this meant that the owners and managers of businesses chronologically compiled the importance of consecutive processes. Each proces has its specific value, i.e. No two processes are located on the same level of importance.

Figure 2 shows that the most important process for the entire sample of businesses is the Production and providing services (level 2.24 – 2.56), followed by the proces of Trade and sale (2.4 – 2.84). The least important processes are Communication with the public 6.87 – 7.93) and Corporate social responsibility (6.34 – 7.19).

Figure 2 The importance of processes in enterprises



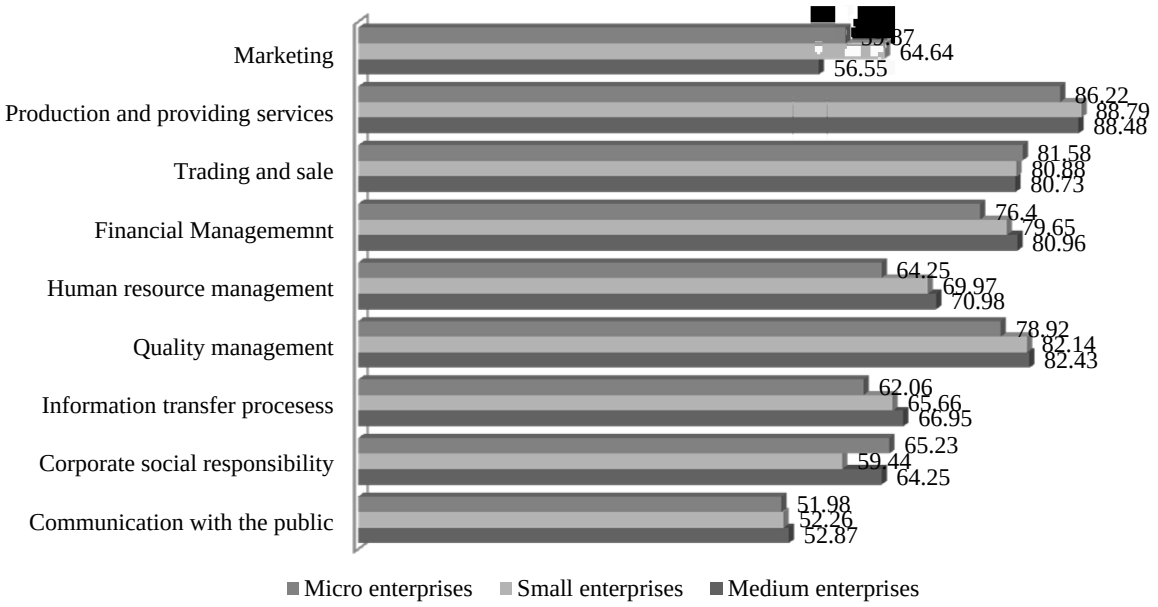
Source: Own processing

After the importance of processes, the functionality of these processes followed, whereby business leaders evaluated the level at which these companies operate in the area. The level scale ranges from 0 – 100%, where 0% means a malfunction of the proces and amounts to 100% error-free functioning of the proces.

The results in figure 3 show differences between the individual processes. The representatives of small and medium-sized enterprises agree that the highest level of functionality of the process is Production and providing services (86.22

– 88.79%; also selected as the most important process), than follows Quality management (78.92 – 82.43%; selected as the third most important process) and Trading and sale (80.73 – 81.58%; selected as the second most important process).

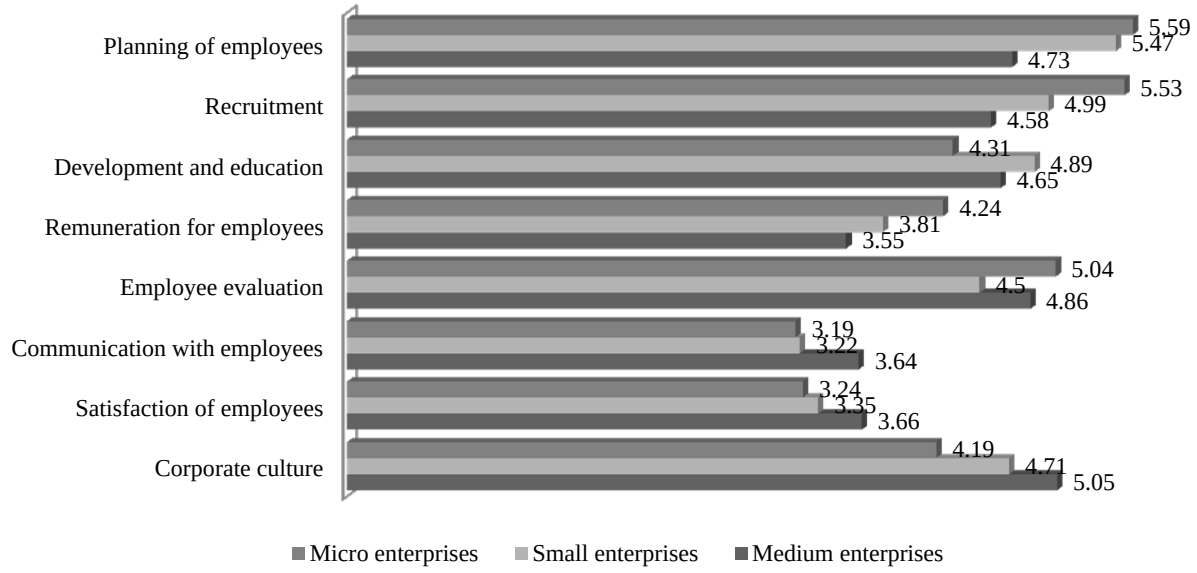
Figure 3 The functionality of processes in enterprises



Source: Own processing

The survey is also focused on the evaluatin of human resource management. Owners and managers various areas in order of importance, at levels of 1 to 8 (integers), with a list that reviewed area for each undertaking separately. Evaluation of importance by an enterprise as level 1 means the most important area in process of human resource management in the company, while the value of 8 is equal to the least important area, selected from a list of 8 evaluated areas. In practice, this meant that the owners and managers of businesses chronologically compiled the importance of consecutive areas. Each area has its specific value, i.e. No two areas are located on the same level of importance. The figure 4 shows that the area Communicatin with employees (3.19 – 3.66) is the best evaluated in the process of human resource management, followed by the areas Satisfaction of employees (3.24 – 3.66) and Remuneration for employees (3.55 – 4.24).

Figure 4 The evaluation of individual areas of Human resource management process

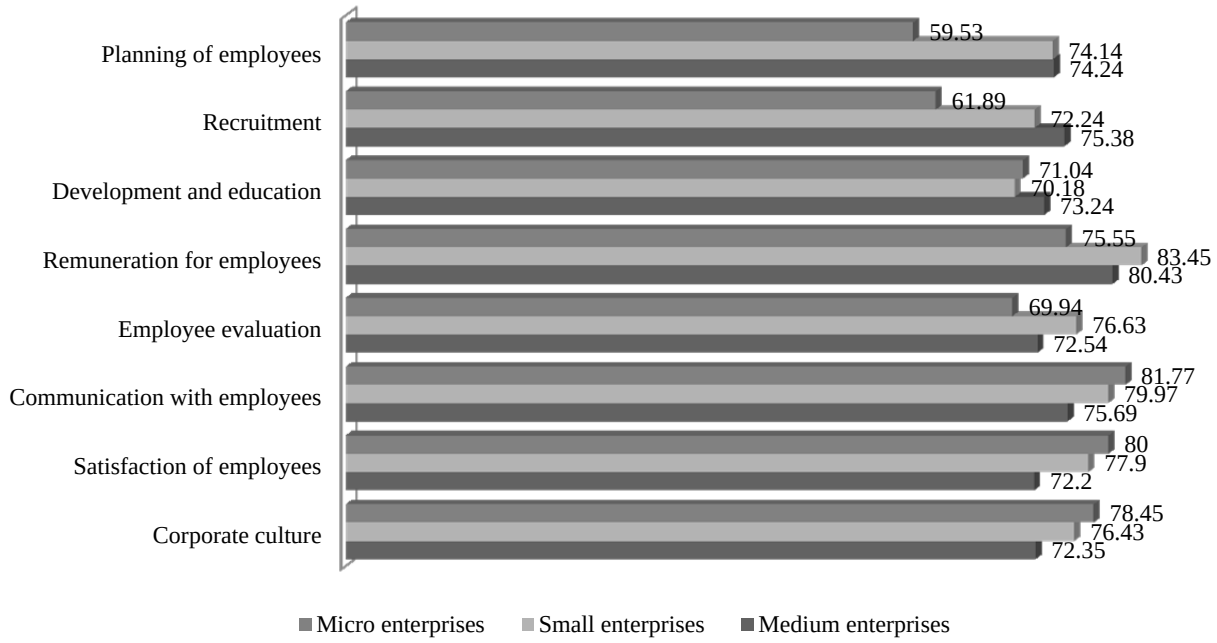


Source: Own processing

Subsequently the surveyed managers and owners reported on the level, that these companies operate in the listed areas. Level Scale ranged from 0-100%, where 0% meant a malfunction in the field and equaled 100% error-free areas

of Human resource management process. In comparison with all investigated areas, the area of communication is in the second position behind remuneration. Figure 5 hows, that all areas of small and medium-sized enterprises according to owners and managers are on the level of 59.93-83.45%, which is pleasant result for small enterprises and medium-sized enterprises, this fact points to the possibility of improving all areas of Human resource management, esspecially for micro enterprises.

Figure 5 The functionality of individual areas of Human resource management process



Source: Own processing

4 Conclusions

Through questionnaire survey focused on process managemnet responded to questions 300 representatives (managers and owners) of micro, small and medium-sized enterprises from South Bohemian region. The companies were categorised according to the number of employees. The sample of enterprises is represented by 58 micro enterprises, 152 small enterprises and 90 medium-sized enterprises.

The basic activity of the company is production which means a connection of production factors in order to obtain certain performance (Chang, 2006). The results show that representatives (owners and managers) of micro, small and medium-sized enterprises consider the process of Production and providing services as the most important process in companies. At the same time, this process has the best functionality. Large shortcommings are found out in the evaluation in the process of Communication with the public. At the same time, this process has the worst functionality. This process is associated with process of Marketing, whose importance and functionality is very low for companies. Communication with the public and Marketing are also necessary for function and competitiveness of the company, it is a reason, why it was suggested to increase monitoring of these processes.

Human resource management is a strategic and coherent approach to the management of an organization´s most valued assets – the people working there who individually and collectively contribute to the achievement of its objectives (Armstrong, 2006), therefore the next part of this paper is focused on individual areas process of Human resource management. Effective communication is an essential part of a smmothly running business organisation. Managers consider the Communication with employees as the best evaluated area in the Human resource management process. This area is located at the second position in the context of the functional areas in the Human resource management process. In the first place is located an area of Remuneration for employees. Worst rated area of Human resource management process called Planning of employees, while the planning of employees is necessary for companies because this are has provided enough capable and prospective employees, who help deliver objectives of company. This is associated with area of Recruitment, which has the worst functionality in this process.

Acknowledgement

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Institutionalized Values and Cultural Dimensions in Development of Societies

Růžena Krninská, Markéta Adamová[1]

Abstract*: This article aims to find shared values in communities, which may manifest as institutionalized features of societies associated with „rules of the game" existing within these communities and try to define them by means of cultural dimensions and to analyse their significance from the point of view of the know of the knowledge economy.*

This paper presents one of possible approaches to cultural dimensions of Geert Hofstede (1999, pp. 34 - 44) and directs their application to determine the state of societies and their shared values to shift to the knowledge economy at both surveyed villages, as well as in small and medium-sized enterprises of the South Bohemian Region. Finding the shared values in enterprises is associated with the detection of the state of corporate culture.

In the South Bohemian Region there were selected two villages with similar fundamentals of cultural traditions, but with different socioeconomic characteristics. They differed significantly in the state of material security and municipal infrastructure. In both villages a quantitative research was conducted by means of a questionnaire method to determine a state of the local communities. In addition a qualitative research using the Test for colour semantic differential (TBSD) was conducted. It can be modified to reveal shared values in the community. For the purpose of this research the Hofstede VSM 94 questionnaire was used.

The development of societies (communities) at any level - business, community, region - is linked to their quality and their development depends on the values shared in these communities. The shared values also indicate the cultural dimensions and are embodied in institutions - the "rules of the game" existing in a particular society (community).

The article is based on research conducted within the research project Socioekonomický vývoj českého venkova a zemědělství registered with the Ministry of Labour and Social Affairs under registration number 1J016/0-DP2 in relation to particular aspects of the project Studium ekonomiky rozvoje venkova na JU v Českých Budějovicích registered with the Ministry of Education under registration number CZ.1.07/2.2.00/07.0178 and research project funded by the Grant Agency of the University of South Bohemia in České Budějovice called "GAJU 039/2013/S – Human resource management of small and medium-sized enterprises".

Key words: Institutionalized Values · Shared Values · Cultural Dimensions · Corporate Culture · Small and Medium-Sized Enterprises · Rural Communities

JEL Classification: R19

1 Introduction

The end of the twentieth century can be associated with the diminishing importance of the positivist-scientific paradigm, which had come to the top of the "industrial" world from the economic point of view. The reason for this approach is the globalizing world of the third millennium. The contents of the revolutionary tendencies of globalization can be compared to the changes that took place during the Industrial Revolution (Truneček, 2004). Gibson (2007) states that the world is entering a "new economy" – "the knowledge economy" – associated with the use of human and intellectual capital, which emphasizes the ability to put knowledge into a new context, together with understanding and skills as the driving forces of change, innovation and competitiveness. It is thus possible to observe an emerging paradigm of the new "post-industrial" world, where apparently the basis for the economy will not be founded on land, money and resources, but intellectual capital (Holátová, Krninská et al., 2012).

One of the academics who were promoting new approaches was Professor Elinor Ostrom of Indiana University in the USA. This Economist takes the approach that – „Institutions matter". These institutions can be understood as „rules of the game" (resp. limitations) that regulate interpersonal interaction. Institutions are distinguished: they can be formal - laws (starting with the constitution), social norms – and casual: emerging spontaneously and historically - such as customs, traditions, conventions, morals, ethics, language, money, market. One can talk about certain plains of culture. Institutions influence actions of individuals and can largely shape their expectations and goals (Holátová & Krninská,

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2012). The method which had developed Ostrom & Ahn (2003) - the method of institutional analysis - became the basis for a new school of thought - i.e. Institutional ecological economics.

According to Hofstede & Hofstede (2005, 15-16) we perceive values as a general trend to differ some facts from other states, and thus it is possible to define the heart of the culture. Values are associated with feelings that have a specific direction, a positive or negative aspect, and indicate what surrounds a human in the categories of "good or bad, true or false, beautiful or ugly, rational or irrational"; they provide the possibility of orientation in the world by the fact that the social reality is structured in terms of importance and corresponding hierarchy. Cultural dimensions according to Hofstede (1999, 34-44), Hofstede & Hofstede (2005, p. 23), based on similar contradictions, will be described in detail in this study.

For an easier understanding of the different indexes and cultural dimensions that are included in these indexes, the authors present a simple overview, taking the bold dimensions, which are, according to the authors, desirable for corporate culture in the knowledge economy.

Table 1 Overview of the indexes of contrasting cultural dimensions with relevant values

Name of index	**Value of dimension**	
	Lower than 50	Higher than 50
Power distance (PDI)	**Small distance**	Big distance
Individualism vs. Collectivism (IDV)	**Collectivism**	Individualism
Masculinity vs. Femininity (MAS)	**Femininity**	Masculinity
Uncertainty avoidance (UAI)	**Acceptance of risk**	Uncertainty avoidance
Long-term vs. Short-term orientation (LOT)	Short-term orientation	**Long-term orientation**

Resource: Krninská, Duspivová (2013, p. 143)

2 Methods

This article aims to find shared values in communities, which may manifest as institutionalized features of societies associated with „rules of the game" existing within these communities and try to define them by means of cultural dimensions and to analyse their significance from the point of view of the know of the knowledge economy.

Both quantitative and qualitative research was conducted at two villages in order to determine the state of the local communities and shared values manifesting in cultural dimensions selected by Hofstede (1994).

The first village is a *larger one*, it has about 1 500 residents, lies about 30 km from the German border on the international highway connecting the capital of the Czech Republic with a major border crossing. The village belongs to the historical territory of Prácheňsko. It doesn't belong to communities near the border, which have been significantly colonized by Germans in the past. The village is accessible to all the usual types of transportation - bus and rail. There is also an industrial production. In addition, the village has a relatively good infrastructure (including sidewalks and a waste water treatment plant). The size of the village is related to existence of a primary school with lower and higher levels of education and to existence of a kindergarten. The village provides a permanent GP.

The second village is *smaller*, it has fewer than 500 residents, it has important cultural traditions and is located at a distance of 20 km from the regional capital, where sources of employment opportunities can be found. Insufficient number of bus lines is focused only on the county seat. Due to its smaller size, this village has an insufficient amount of funding to ensure good technical infrastructure. The village has a school with only lower level of basic education. Medical care is associated only with a doctor's field office during certain hours and days of the week.

The quantitative research of villages was carried out via the questionnaire (with 36 questions). The selection of the sample for the quantitative research of villages was conducted by random sampling of households. The size of the selected sample was adequate to the size of the complete sample. Questionnaires were distributed to selected households. And their return was 34.8% in the smaller village and 25.8% in the larger village. Obtained information was about the mobility of human resources, possible forms of employment, amenities, satisfaction with living in the village, interpersonal relationships within the community and compliance with customs and traditions in the village and the relationship of these inhabitants to these customs, traditions and the local natural environment.

A qualitative research of villages using the Test for colour semantic differential (TBSD) has been also conducted in both villages. It can be modified to reveal shared values in the community, which are a prerequisite for the institutional aspects in a society. TBSD is included among the methods used in the Czech psychological diagnosis and belongs to the association of chromatic experiments. In can be considered as a projective test of personality, which combines several methods of capturing researched reality: approaching verbal associative experiments, as well as the group of color tests and using also a procedure for an own judging range. TBSD can be effectively used in all fields of psychology, where it is necessary to diagnose personality. And can be used especially for capturing the social relationships of human, including his individual value system. With TBSD one can evaluate the hierarchy of values, both conscious and unconscious aspects of individuals and society (Ščepichin et al, 1992). It is therefore useful in the field focused on society and cul-

ture in identifying shared values in societies (community), which are the basis of the institutional aspects. TBSD was submitted to probands subsequent to the questionnaire survey, but only to a representative sample (qualitative research) to determine values in the context of cultural dimensions, which are shared within the two selected societies (communities). The manual requires to use 12 colors from each other well recognizable, naturally occurring and 60 symbols (incentive words), which were divided into cultural dimensions according to Hofstede (1999): large power distance, low power distance; individualism, collectivism; masculinity, femininity; short-term orientation, long-term orientation, certainty, risk. Respondents were asked for assigning each incentive word three colors, then sort these colors from the most sympathetic one to the least sympathetic. For every word colors have been replaced by the number of color (according to the hierarchy of colors) from 1 to 12 and these numbers were summed. The arithmetic average of summed numbers was calculated for the society, which reflects the hierarchy of words (symbols) in society (community). The hierarchy of symbols becomes a scale of values, arranged in a sequence, according to the sensitivity of perception and acceptance of the community (in the first place the highest rated, the last place the lowest rated incentive word - symbol).

For the processing of data obtained from TBSD a VADIM computer software and a TBSD Result Appraisal 2.0b have been used. With their contribution the most often associated symbols (stimulus words) in society have been found, which express commonly shared values of the community.

Furthermore the questionnaire VSM 94 (hereinafter referred to as VSM 94) was used for the quantitative research of enterprises. VSM 94 was filled both with executives (managers, owners, directors, personnel managers) and employees of the same small and medium-sized enterprises, as the structured questionnaire. VSM 94 was evaluated according to the methodology for data processing of VSM 94 (Hofstede, 1994). According to this methodology, individual indices of the dimensions take values from 0 to 100, but it is not an exception that it takes lower or higher values. Individual indices implies two contradictory cultural dimensions, the first one is achieved when the results are in the range from 0 to 50 and the second dimension is achieved when the results are in the range from 50 to 100, see Table 1. According to the authors the middle values (about 50) are in a gray zone, also called the transition zone, where it is not clear to which dimension the company adheres to. For this reason, the intervals of evaluation are distributed as follows: $(-\infty, 40)$ for the first cultural dimension, (41, 60) for the so-called gray or transition zone and $(61, \infty)$ for the second, opposite cultural dimension. Questionnaires were completed in 105 small and medium-sized enterprises of the South Bohemian Region. These businesses were composed of 32% of micro-enterprises (enterprises with 1-9 employees), 40% of small businesses (businesses with 10-49 employees) and 28% of medium-sized enterprises (enterprises with 50-249 employees). These categories of enterprise sizes defined by the number of employees was carried out by Commission Regulation (No. 800/2008).

3 Research results

3.1 The results of the research of cultural dimensions at the local level in municipalities in connection with institutionalized aspects.

Large power distance versus low power distance

Symbolic stimulus words representing power are perceived rather positively in the greater village compared to the small village where they are perceived rather negatively. In the larger village within the stimulus words representing of power distance within the value order is the word power highest in ranking. In the smaller village is institutionalized low power distance with the institution of trust, which is for them very high in the ranking order.

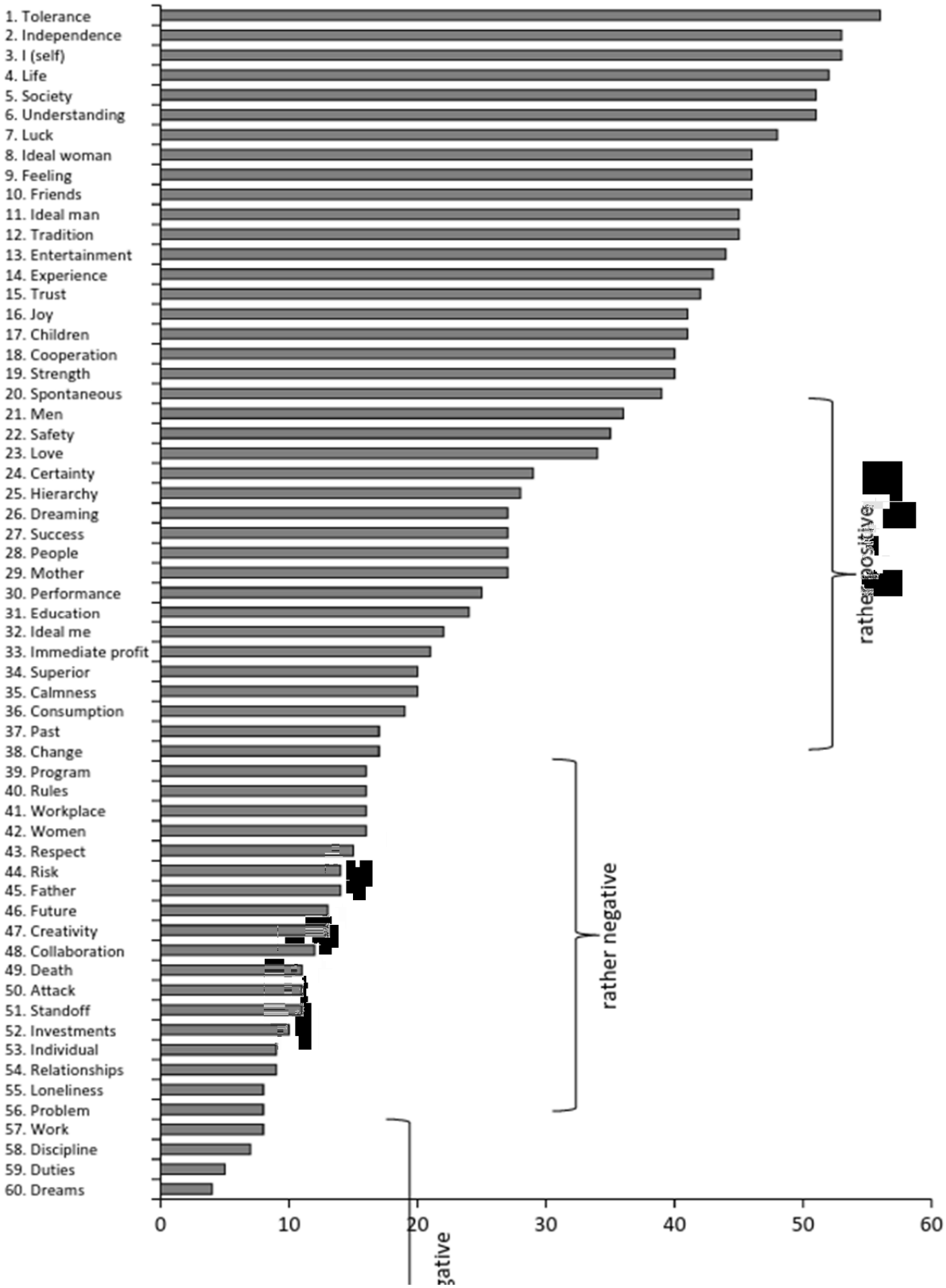
Individualism versus collectivism

In the larger village the individualism is rather institutionalized. In contrast, in the smaller village the society (community) is oriented to collectivism. It is demonstrated by following stimulus words: society, love, friends and cooperation, which are very positively shared by the community and are also very positively perceived at the very top in the hierarchy of values in the following order: friends, society, love, cooperation. A stimulus word company is in the first place in the ranking order of shared values, therefore it is the most shared symbol of the community. A stimulus word friends is also in the first place in the ranking order of shared values.

Masculinity versus feminity

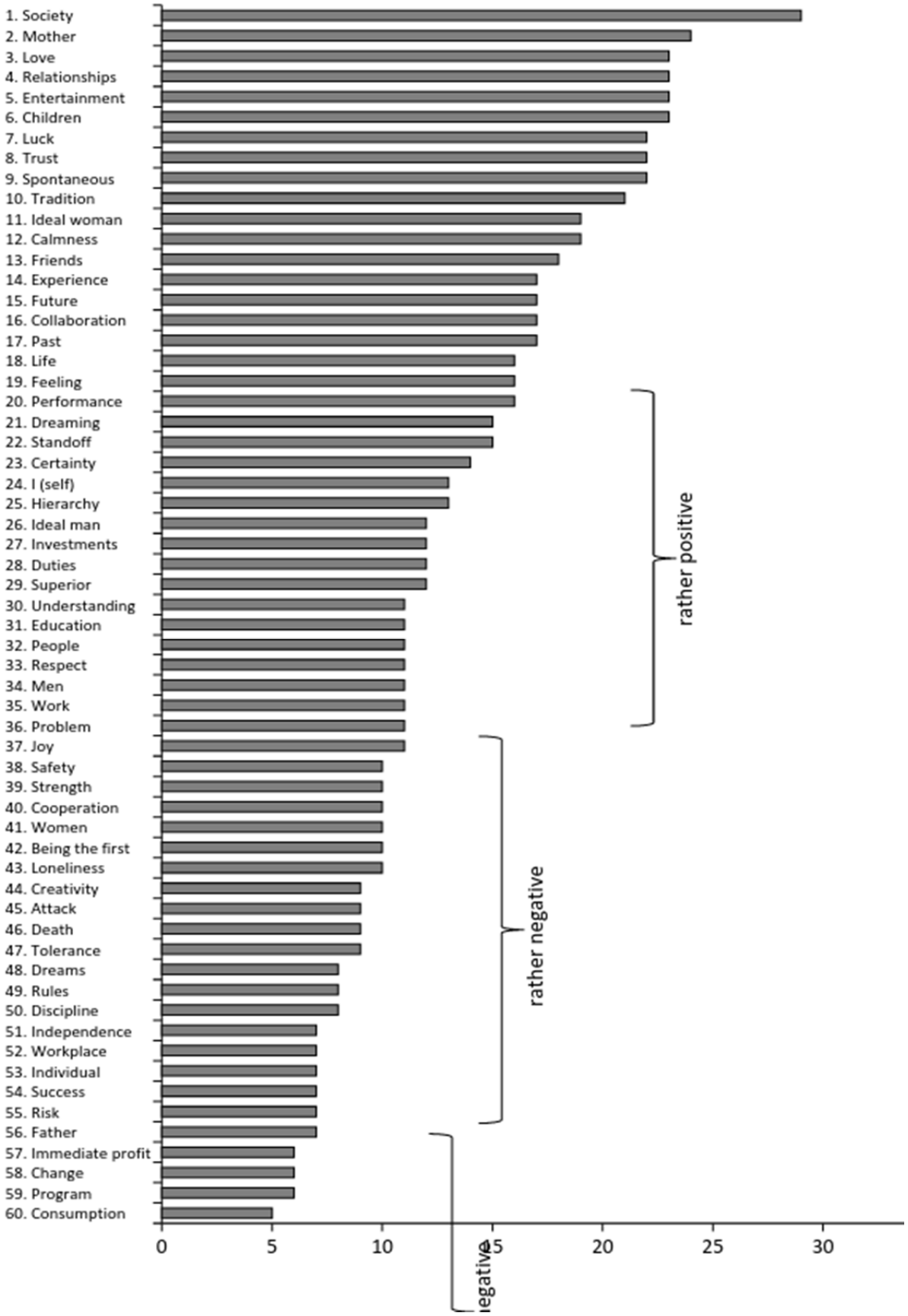
The larger village could be described as a community presenting itself as a tolerant, rather masculine society. The smaller village acknowledges feminine values much stronger and also gives less importance to masculine values. In the smaller village there is feminine cultural dimension institutionalized. Very surprising is the finding that the village once famous for the miraculous painting of the Madonna is still sharing and experiencing the symbol of mother (after the word society it is the most shared symbol), which is thus institutionalized in this community.

Figure 1 The order of shared values (associated symbols) in the community of the larger village



Source: authors

Figure 2 The order of shared values (associated symbols) in the community of the smaller village



Source: authors

Short-term orientation versus long-term orientation
Both societies in both villages are rather long-term oriented, more significantly the smaller village. The small village community is strongly institutionalized to long-term orientation dimension. The results show a surprisingly unambiguous conclusion, that a strong link with the traditions predetermines a long-term perspective of life in the future. It confirms the reality of this village that the community lives very intensely in the area linked to strong millennial traditions in connection to the natural order and the natural environment (which the results of the survey confirm).

Strong uncertainty avoidance (certainty) versus weak uncertainty avoidance (risk)
In the larger village a cultural dimension of certainty is rather institutionally accepted. But taking risk is not strongly negatively avoided. In a small village it is specific to reject risk in the sense of mere risk-taking, along with the rejection of restrictive rules that would suppress creativity, which opens to the community a suitable way to solve a problem. It is kind of a proven good middle way, where through creativity it is possible to accept changes and solve problems when at the same time rejecting major risk and rigid rules.

3.2 The results of the survey by questionnaire method to determine the objectivistic state of the communities in the surveyed villages.

Interview conceived all major areas of rural life. The introductory part contained identification data, followed by seven thematic areas: mobility of human resources, employment, education, civic amenities, including transport services, interest in culture, satisfaction with the appearance of the village and interpersonal relationships in the village.

Table 2 Summary of factors of socioeconomic characteristics of selected villages

Selected factors of socio-economic characteristics of municipalities	Rating of the factor strength[1)]	
	Smaller village	Larger village
Job opportunities in the village	insufficient	sufficient
Transport services	weak	sufficient
Technical Infrastructure	insufficient	sufficient
Civic amenities - education	weak	sufficient
Civic amenities - Medical Care	insufficient	sufficient
Satisfaction with interpersonal relationships	strong	weak
Link to the traditions	strong	weak
Link to the natural environment	strong	sufficient

Source: processed data of Popeláková (2009)

Despite the smaller village suffers all the drawbacks of material-technical elements, its residents are much happier with interpersonal relationships (Table 3).

Table 3 Evaluation of human relationships in communities

Rating	Results in percentage	
	Smaller village	Larger village
Very good	18	0
Rather good	65	48
Rather bad	7	23
Bad	0	14
I'm not interested	10	25

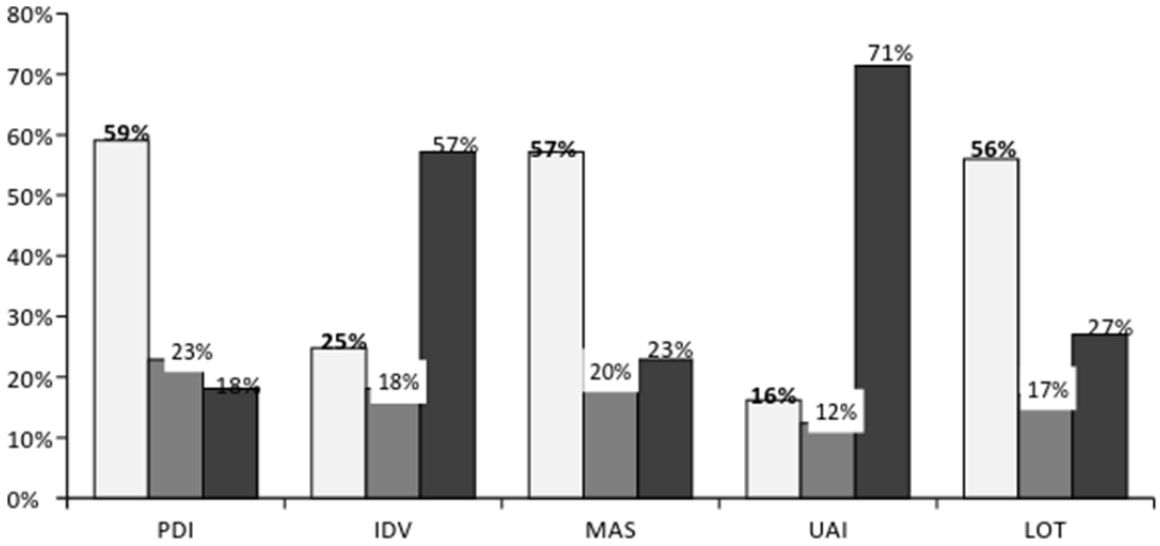
Source: processed data of Popeláková (2009)

Benefit of this research is the finding that the connection of culture, traditions and natural environment with interpersonal relationships is significant and has an overall stabilizing effect on rural communities. The smaller village suffering of poor material-technical factors becomes due to the strong cultural traditions more stable than the larger village with sufficient material and technical base. Old folk customs unite the people, improve interpersonal relationships and are transferred to the village sociality, because the culture is an accumulated experience of the social whole and acts as a controlling component of any social system.

Figure 3 shows the results obtained using the VSM 94, which show the condition of cultural dimensions small and medium-sized enterprises. In this research sample in this research clearly prevails the cultural dimension of small power distance – PDI (59%), femininity – MAS (57%) and long-term orientation –LOT (56%). Companies more incline to individualism -IDV. Absolutely clear is the inclination to the cultural dimension of the strong of uncertainty avoidance -UAI, to which leans 71% of surveyed small and medium-sized enterprises and which is related to problems with adapting to changes of the globalized society, avoiding the uncertainty and fear of risk-taking, but also blocking the path to the knowledge economy.

For the societies of different levels (enterprises, municipalities) shared values of cultural dimensions can be found.

Figure 3 Percentage distribution of SMEs in particular cultural dimensions and their intervals



Source: authors

3.3 Discussion

Together with the power of shared cultural traditions in the country are appearing principles of cohesion in the community and in relation to this area.

Inhabitants of the small village with strong traditions and customs, who collectively participate in a traditional rural social life, are considerably satisfied with the interpersonal relationships in the village. Strong millennial traditions persist as institutionalized and affect the people today as well as the previous generation in the small village.

Dealing with the stability of rural space and rural communities, it will be necessary to apply a stronger connection of material and technological background with intangible elements such as cultural traditions, the shared values determined by cultural dimensions, and their effects on our present existence. Working with cultural memory and cultural capital therefore means to count with open, lively, institutionalized and "meddling" past that is becoming an important factor, which is shaping our presence.

According to Mlčoch in Hudečková, Lošťák & Ševčíková (2006) institutional arrangements inside and outside of the society have a direct impact on regional development from the perspective of regional economics. Social institutions are connected with the local culture, customs, traditions and other established ways people interaction that get an institutionalized form as a family, various clubs, associations, etc. The way regional authorities work, in other words which cultural norms are embodied in institutions in a particular area (for example people consider it normal to work without a contract), gives a space to the institution of illegal employment or to the black market, underground economy, etc. What is the role of family and what are the positions and activities of NGOs, of the civil society, all of it affect the development of the region.

The effectiveness of institutional structure of certain region or of the whole country is becoming more and more recognized as an important factor for regional development. This factor has at least the same effect on the development of the region as traditionally presented material factors such as infrastructure (Hudečková, Lošťák & Ševčíková, 2006).

If a responsibility for regional policy is to have a real chance of success in post-communist countries, it is necessary to create institutional and structural assumptions. It is associated with the creation of natural communities and supports their development, whose absence hinders the possibility of shifting in a new direction. Local or regional self-governing bodies and other entities must obtain a space for communication and meaningful cooperation, including contact with European institutions and effective participation in the regional and the structural policy of EU. (Krninská & Duspivová, 2013).

4 Conclusions

In summary, the community of the larger village has rather large power distance with the institutions of power, then there is individualism institutionalized. The community of the larger village lies rather in at the interface between the more feminine and the more masculine cultural dimension (masculinity is associated with tolerance and understanding). Then there is institutionalized the dimension of rather long-term orientation and cultural dimension of certainty. The institutionalization of rather large power distances and individualism may explain the dissatisfaction with interper-

sonal relationships, which among other things result in tendencies of the inhabitants to leave the village (found out by the questionnaire survey). Though all material values including good infrastructure are secured in the village.

In contrast, in the smaller village, where ensuring of material values and provision of infrastructure is missing, its residents do not think about moving from the village. The community of the smaller village has institutionalized a small power distance with the institution of trust, collectivism with institution of society sharing and strongly institutionalized feminine society (trust and understanding), strongly long-term oriented, with the institution of traditions. Refusing cultural dimension of risk in the form of rules is associated with strongly perceived creativity as it is a way leading to certainty. Tradition and old folk customs shared throughout the society of the whole community unite the residents, improve interpersonal relationships, and shape the community of the village and its link to the natural environment. Community cohesion is more important than material deficiencies. Residents of the smaller village are not thinking about leaving the village as opposed to residents of the larger village. The community in the smaller village is also documented by the coexistence of the two generations. The younger generation have to convey a contact with the 20 km distant city (substitutes some of deficiencies in the village - pharmacy, doctor) for the older generation. All generations of the smaller village should be interested in revival of the extinct traditions.

The survey results show that the importance of lived cultural traditions in rural areas emerge in the context of cohesion of its societies (communities) and they act as a stabilizer of social and economic development (also of the communities) and its sustainability in the particular area.

It can be concluded that the link of the economy (from the institutional view) and the social system is going through cultural dimensions, which are actually culturally shared values and are embodied in institutions - "the rules of the game", existing in the community (municipality, enterprises). Direct and indirect influences on the economic and social development of society are associated with the state of culturally shared values of society at all levels, starting at the level of local community municipalities or enterprises. The created institutions associated with symbols – created by the shared values (e.g. cultural values knowledge economy) forming "rules of the game", which then influence the behaviour of individuals and the whole society in this local institutional level. For supporting the development of the societies it is necessary to work with the fact that the institutionalized values of higher societies (global community, state, region, municipality, enterprises) are affecting the lower societies. Assuming that the global community is not shifting towards the knowledge society, it is appropriate to strive for the institutionalization of the desired cultural dimensions by Hofstede, which are supporting the transfer of knowledge at all levels.

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International Road Cargo Transports Risks – The Czech Transporters' Perspective

Viktor Vojtko, Lucie Tichá[1]

Abstract*: Cargo transport is one of the crucial parts of modern supply chains. It is possible to choose amongst different means of transport but the road transport is being chosen in majority of cases within continental Europe mainly due its speed, flexibility and reliability.*

From the perspective of the Czech Republic as a heavily used transit country for such a road transport, further analysis of international cargo transport risks might be beneficial, both from the supply chain management and government regulation point of view.

This paper deals in detail with data collected from an online survey which was distributed to all ČESMAD BOHEMIA members' email addresses during October and November 2013. The returned questionnaires are covering the whole range of cargo transport providers according to their size.

The questions were focused mainly on risk issues – types, causes and frequency of occurences of damages happened during transport, trends and experience with insurance companies, e.g. the proportion of damages paid.

The results may be used mainly for supply chain management risk management policies development and benchmarking between road cargo transport providers.

Key words: Transport · Road Cargo Transport · Supply chain · Risk Management · Transport Insurance

JEL Classification: M10 · M16 · N70

1 Introduction

The international cargo transport is a crucial part of modern supply chains. And the risks related to losses or damages of goods and services during transport may have a significant impact on their overall economic performance. The main reason for it is that induced costs of such an event are related not just to the value of lost, stolen or damaged goods, but also for instance to medical treatment and staff absence, production delays, damage of other property etc. And there are also significant side effects or negative externalities of transport of goods, like pollution, landscape changes, security issues, injuries and deaths of animals and people as well.

From this perspective, deeper understanding and further analysis of risks related to the international cargo road transport is necessary and may be beneficial for different parties in different ways. For businesses that may mean better decision making in the areas of supply chain risk management, security and corporate social responsibility and for government authorities it may help in better regulation of unwanted side effects – especially in the Czech Republic which is due its' geographic position very often just a transition country.

This paper is focused on one of the abovementioned perspectives – risk and risk management in international road cargo transport. The research presented here has been done from the Czech road transporters' perspective and summarizes main trends in occurrence of accidents, causes of these accidents and experience with insurance companies. As far as we know a research like that has not been done in the Czech Republic yet and not a lot of research has been done in this area worldwide.

2 Literature review

The international cargo transport modes may be due to Sixta & Mačát (2005) – rail transport, road transport, public transport, air transport, water transport (sea, river), combined and unconventional (pipeline, cable etc.) transport.

All these modes of transport rely on a specific infrastructure, which has different features and thus contributes to the overall risk. For example, rail transport may be cheaper and environmentally friendlier but due to schedules, reliability and availability of logistic support may contribute to a higher risk of delays. This may significantly decrease the attrac-

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tiveness of such a mode of transport. Also for the Czech Republic, as a landlocked country, sea water transport is not directly available at all.

On the other hand, infrastructure for the road transport allows different routes to be chosen, which may reduce the risk and increase flexibility and attractiveness. From this perspective it is not surprising that for the Czech Republic "in 2010 road haulage accounted for 81% of the total freight carried in the country" (Business Monitor International, 2012). The road infrastructure in the Czech Republic is also very extensive, "roads extend for 127,719km, all of which is paved. Of this, 729km is expressway" (Business Monitor International, 2012), which increases the attractiveness of this transport mode.

The importance of transport in supply chain performance has been recently recognized by several authors (e.g. Tracey, 2004 or Sanchez-Rodrigues, 2010) but this topic has not been researched very well yet. As a systematic attempt to describe the main sources of uncertainty in transport it is possible to mention a conceptual model created by Rodrigues et al. (2008). The authors have identified 5 main sources of uncertainty in transport operations:

- Shipper,
- Customer,
- Carrier,
- Control systems,
- External uncertainty.

This approach tries to deal with sources of uncertainty only, not with the overall risk which can be estimated probabilistically. We would like to add the risk component with our research and contribute to the usability of abovementioned model by Rodrigues et al. (2008).

From the risk management perspective, it is not important just to identify the risks, but also to analyze and evaluate them and undertake necessary measures (Dallas, 2006). In this sense, there are several ways how to decrease the level of risk for an organization – e.g. design of robust processes, risk avoidance actions and insurance. Due to its' frequent use and importance, we pay an additional attention to the transporters' use of insurance and experience with this issue.

The insurance which is being used in international road cargo transport may generally be related to external sources of uncertainty (in other words not caused by the carrier, typically insurance of the property itself) or liability of the carrier (damages caused by the carrier). It is necessary to mention that the carrier liability is limited on the basis of Convention on the Contract for the International Carriage of Goods by Road (CMR) from 1956. This international convention covers road transports in the cases when the place of departure and destination are in different countries and at least one of those countries has ratified the CMR Convention.

3 Goal and methodology

The main goal of this research was to identify and quantify risks in international road cargo transport from the Czech transporters' perspective. We also wanted to know transporters' use of insurance and their experience with insurance companies.

The method used for data collection was an online survey using Survio.com. A questionnaire containing 18 questions in the Czech language was developed and pilot testing was undertaken in October 2013. The questions were divided to several groups:

- *Identification questions* – legal entity, company seat region, proportion of domestic/international cargo transport in 2012, company age, number of employees in 2012, number of truck drivers in 2012, size of their fleet in 2012, amount of cargo deliveries in 2012.
- *Specific questions related to damages or losses occurred in 2012* – amount of damages/losses cases, proportion of these cases caused by truck drivers, induced costs, proportion of the costs covered by an insurance, proportion of different causes, tendency of these cases from 2011 – 2012 caused and not caused by drivers.
- *Specific questions related to insurance* – types of insurance in use, selected insurance company, satisfaction with their insurance company and reasons of dissatisfaction.

The survey was conducted in cooperation with ČESMAD BOHEMIA, which is the biggest association of Czech road cargo transporters and has more than 2000 members operating more than 20 000 vehicles. During October and November 2013 the questionnaires were distributed to all ČESMAD BOHEMIA members' email addresses. Out of 1900 emails sent, 71 questionnaires were fully answered, covering the whole range of cargo transport providers according to their size. The response rate of this survey was 3.7% which can be expected for an online survey.

Due to the limited length of this paper only several questions are analyzed here in detail and the following hypotheses are tested:

- *H1: Older companies have lower proportion of damage/loss cases in comparison the overall amount of cargo deliveries than younger companies.*

  This hypothesis is based on our assumption that older companies have more experience in risk handling and thus they typically have significantly lower proportion of damage/loss cases.

- *H2: Bigger cargo transport companies are more successful in claiming damages/losses to insurance companies.*

  This *hypothesis* is based on our assumption that bigger companies have bigger negotiation power and more resources thus they should be better off in claiming damages/losses from insurance companies.

4 Research results

4.1 Sample composition and representativeness

The sample consists of 71 responses. The frequencies due to their legal entity, company seat region and number of employees and number of truck drivers follow in the tables 1 – 4. It is obvious that bigger companies may be slightly overrepresented in the sample, on the other hand, all regions but Karlovy Vary are present in the sample with comparable proportions. Thus it is possible to assume that the sample might be broadly representative from these perspectives and cautious generalization could be possible.

Table 1 Sample composition – legal entities (N=71)

Legal entity	Frequency	Percent
PLC (a.s.)	8	11.27%
Ltd. (s.r.o.)	60	84.51%
LLP (k.s.)	2	2.82%
General partnership (v.o.s.)	1	1.41%

Source: Own processing

Table 2 Sample composition – company seat regions (N=71)

Region	Frequency	Percent
South Moravia	8	11.27%
South Bohemia	10	14.08%
Hradec Kralove	4	5.63%
Liberec	1	1.41%
Moravia-Silesia	4	5.63%
Olomouc	2	2.82%
Pardubice	5	7.04%
Plzen	4	5.63%
Prague	8	11.27%
Central Bohemia	12	16.90%
Vysocina	4	5.63%
Zlin	4	5.63%
Usti nad Labem	5	7.04%

Source: Own processing

Table 3 Sample composition – number of employees (N=71)

Number of employees	Frequency	Percent
0-25	41	57.75%
26-50	10	14.08%
51-100	7	9.86%
101-200	7	9.86%
201-300	2	2.82%
More than 300	4	5.63%

Source: Own processing

Table 4 Sample composition – number of truck drivers (N=71)

Number of employees	Frequency	Percent
0-25	49	69.01%
26-50	10	14.08%
51-100	6	8.45%
101-200	3	4.23%
201-300	1	1.41%
More than 300	2	2.82%

Source: Own processing

Table 5 Sample description – means, standard deviations and medians

Variable	Mean	Median	Std. deviation
Proportion of international cargo transport (N=71)	70.55%	85.00%	30.31%
Company age (N=71)	16.65 yrs	18 yrs	7.29 yrs
Fleet size (N=71)	51.11	9	159.11

Source: Own processing

4.2 Survey findings

For risk management purposes it is necessary to know descriptive characteristics of damage/losses cases put in the right context. In the following table 6 the most important findings related to cargo deliveries and damages/losses are summarized.

It is clear from the table 6 that the most important cause of cargo damages/losses is related to truck drivers (around one half of all cases). This suggests that the truck drivers are the weakest point from the risk management perspective. The second biggest cause is related to traffic accidents caused by somebody else with 27.37% share. Altogether traffic accidents count for nearly 60% of all damages/losses.

Also average induced costs are really significant – nearly 1 million CZK (approx. €37000) per company in the year 2012, of which 67.8% was on average covered by successful insurance claims.

Table 6 Results for the year 2012 – means, standard deviations and medians

Variable	Mean	Median	Std. deviation
Amount of cargo deliveries (N=70)	273928.47	1634	2231250.19
Amount of damages/losses cases (N=71)	387.61	5	2183.51
Proportion of these cases caused by truck drivers (N=71)	56.07	60	35.27
Induced costs in CZK (N=71)	948037.37	140000	2396270.52
Proportion of the costs covered by successful insurance claims (N=70)	67.8%	80%	30.93%
Causes of damages/losses – traffic accident caused by truck driver (N=71)	31.82 %	29%	31.38%
Causes of damages/losses – traffic accident caused by somebody else (N=71)	27.37%	20%	30.20%
Causes of damages/losses – truck driver negligence (N=71)	15.69%	1%	30.12%
Causes of damages/losses – cargo damaged (N=71)	13.34%	0%	24.99%
Causes of damages/losses – cargo stolen (N=71)	4.69%	0%	15.92%
Causes of damages/losses – natural disaster (N=71)	0.77%	0%	2.88%
Causes of damages/losses – other (N=71)	6.32%	0%	19.42%

Source: Own processing

It is also possible and meaningful to calculate some additional ratios. For instance an interesting one may be proportion of damages/losses on all cargo deliveries, which is in this case on average 1.01% (with median 0.31% and std. deviation 2.1%). This means that without any risk management involved, i.e. if transport company selection would be random, there is 1.01% probability of having a delivery compromised. The values of this proportion are ranging between 0% and 14.67% in the whole sample which suggests that a good evaluation and selection of cargo transport companies may have a really significant impact on the risk.

On the other hand, if we calculate the same percentage from the summarized data about cargo deliveries, the average would be only 0.11% (with median 0.31%) due to extreme differences between companies (one company in the sample represents 97.39% of all cargo deliveries from the sample, its' proportion of damages/losses on cargo deliveries is only 0.09%).

This finding shows that rules that could be used for proper evaluation and selection of transport companies by their prospective customers involved in supply chains should not be based just on costs and delivery terms, but additional indicators should be introduced to help in risk reduction as well – especially when dealing with not previously known transport companies in new territories. We propose here for instance the company age – which is being tested in this paper through hypothesis H1. It is also possible to imagine use of some other easily available indicators for evaluation, e.g. company size but this is out of scope of this paper.

Another additional interesting ratio may be the average induced cost per one cargo delivery, which is in this case on average CZK 234.7 (with median CZK 94.06 and std. deviation 566.41). Again, there are huge differences between the transport companies in the sample with the highest average induced cost per one cargo delivery being CZK 3750. It would of course depend on the type of cargo being delivered as well as on internal company policies of which we have no data available. Also, no clear relationship between this ratio and transport company characteristics has been found in the data which suggests that further research is needed to be able to include this indicator to risk assessment procedures.

The last set of questions was focused on insurance. The results show that 71.83 % of respondents use insurance of drivers' liability and 88.73% of respondents use CMR cargo insurance. Satisfaction with insurance companies is quite high – 84.72%.

The finding that not all of the companies use the insurance is quite surprising in comparison with the overall level of risk in the transport. This risk might then be also passed to their customers without even knowing. This suggests that further caution is needed and insurance use should be regularly checked.

4.3 Hypotheses testing

We have defined two hypotheses for testing for purposes of this paper. Because the sample was not probabilistic and findings are of exploratory nature we are providing the information about statistical significance just for information purposes.

The hypothesis H1 may be tested for instance by using Pearson correlation coefficient used on variables company age and calculated proportion of damages/losses on all cargo deliveries (both interval variables). This correlation coefficient is statistically significant at the 95% confidence interval ($N = 69$, $T = -2.47$, $P = 0.02 < 0.05$) and has value $r = -0.29$ which shows moderate negative dependence. We can conclude that the hypothesis H1 can be approved.

The second hypothesis H2 is related to negotiation power and puts together variables number of employees and proportion of costs covered by successful insurance claims. This hypothesis may be tested for instance using Kendall's tau c correlation coefficient (used for ordinal variables, rectangular table). This correlation coefficient is statistically significant at the 95% confidence interval ($N = 70$, $Z = 2.13$, $P = 0.03 < 0.05$) and its' value is just 0.17 which would mean a very weak dependence based on monotonicity of related pairs in data. The hypothesis H2 can be approved although the relationship seems to be very weak.

5 Discussion and conclusions

The results, although limited, that have been shown above, according to our opinion enrich the conceptual model of uncertainty sources in supply chain transport created by Rodrigues et al. (2008) with numeric data providing a basis for quantitative risk assessment and benchmarking – usable both for businesses and government authorities. It would be good to have similar data from other countries to compare the overall performance and identify factors that may contribute to the better performance of road transportation.

Some of the key findings are related mainly to the causes of damages/losses happening in road cargo transports. Traffic accidents in our case count together for nearly 60% of damages/losses which raises a question whether the safety measures being used by government authorities and businesses are sufficient.

Another important finding is that on average 1.01% of deliveries may be compromised due to transportation related problems. There are also big differences between various cargo transportation companies which increase the overall level of risk of choosing a wrong one without introducing proper measures for that.

We have been also able to provide some evidence for hypothesis, that this cargo transport performance may be related to the experience gained through company ageing. Further analysis of other possible discriminating factors should be encountered in the future.

We are planning to test these quantitative indicators further using agent-based simulation of various supply chains to find out whether this could lead to an improvement in policies being applied. This as we hope should enhance the whole framework of risk assessment procedures in supply chain management.

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Investor State Dispute Settlement in Free Trade Agreements: An Australian Perspective

Roberto Bergami[1]

Abstract: *Investor State Dispute Settlement (ISDS) clauses in Free Trade Agreements (FTA) have gained increased prominence in response to recent activity from investors and governments alike. This has become a global issue given the number of new disputes and the explosion of FTA and regional trade agreements that have been spawned as a result of the stalled World Trade Organisation talks.*

In 2013 alone 57 new ISDS cases were commenced, covering a wide variety of sectors, including: supply of electricity/gas; oil and mining; telecommunications; manufacturing; construction; tourism; banking; real estate services' retail; media; and advertising. Whilst these cases will typically require prolonged settlement periods as they weave their way through negotiation and litigation, this does not alleviate concerns about ‚special' investor provisions and what they mean for the recipient investment nation.

There are two main perspectives on ISDS. The first is the government that is seeking to entice foreign investment in such a manner that makes it attractive to would-be investors, but at the same time retain the right to ‚properly govern the nation, including making future changes for the benefit of the nation's citizens. The second perspective is that of the investor who, understandably, is looking to have their inputs protected from potentially unfavourable future government policy changes.

This article provides a summary of Australian FTA, highlighting ones with ISDS provisions, concluding there is no clear convergence on competing perspectives of governments and investors and a solution to please all is unlikely to be forthcoming in the near future.

Key words: Foreign Direct Investment · International Economics · International Business · Free Trade Agreements

JEL Classification: F13 · F23

1 Introduction and Literature Background

This paper considers Investor State Dispute Settlement (ISDS) clauses in Free Trade Agreements (FTA) focusing on their application and desirability. Firstly, some background is provided in relation to the development of ISDS in the context of a more globalised economy and changing trade and investment patterns. This is followed by a brief literature review, prior to a short description of the methodology. The discussion of ISDS is provided next, from an Australian perspective that considers the changing attitudes on ISDS resulting from changes in government ideology, before reaching the conclusion. It should be noted this paper does not focus on the legalities of various systems, nor does it concentrate on the different type of ISDS clauses that may exist in the multitude of FTA around the globe, rather the approach taken is at a more ‚macro' level, preferring to argue the points in principle, from a more ideological perspective and restricting detailed discussion to the Australian business environment.

Investor State Dispute Settlement (ISDS) refers to a mechanism for „the settlement of disputes between investors and the countries in which they are established [and] is a key aspect of investment protection under international investment agreements (IIA)". IIA provisions are commonplace in FTA nowadays. In relative terms, ISDS are a new mechanism that only began to emerge in the mid-twentieth century and one that has had a different, and arguably beneficial, impact on settling disputes among nations. In fact, prior to ISDS „disputes that could not be resolved by direct investor-state dialogue or proceedings in domestic courts were either not settled or were handled by home State espousal of the claim via diplomatic processes or, at times, by the threat or use of military force" (Organisation for Economic Co-operation and Development, 2012, p. 7).

As „trade and foreign direct investment tend to be correlated" (Kirchner, 2008, p. 14), it has been argued „the principles for the protection of FDI [Foreign Direct Investment] and ISDS should be implemented multilaterally" (Bundesverband der Duetschen Industrie e V., 2014, p. 4). Whilst there is currently no international standard for the development and application of ISDS, these have nevertheless increasingly been inserted into all types of FTA, as these

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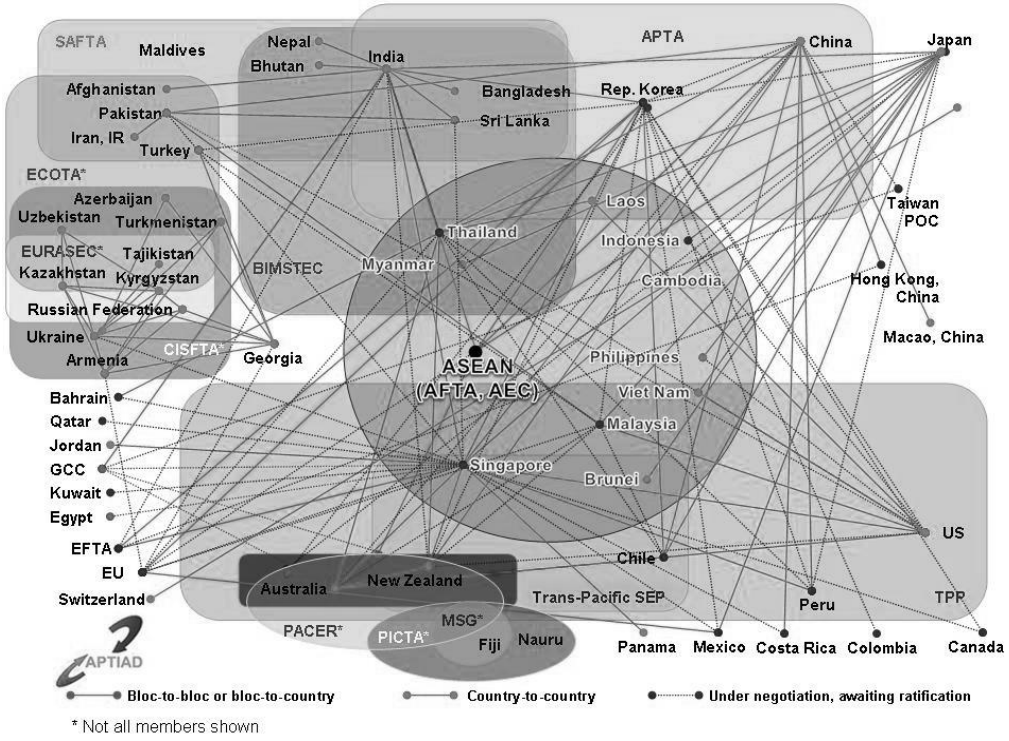
move beyond tariff reduction commitments that, in many cases, take decades to fully implement. The more recent FTA generally „seek to facilitate trade and investment transactions ... [but at the same time] contain commitments to liberalise and/or protect investment flows between the parties“ (United Nations Conference on Trade and Development, 2007, p. 3). The main thrust of ISDS is the protection of investors against discrimination, expropriation or nationalisation, and by providing a minimum standard of treatment through particular processes specified in FTA.

It is generally accepted that the failure of the WTO to move beyond the stalled Doha round of multilateral negotiations has been the major catalyst for the ‚explosion' of FTA around the world generally, and particularly in Asia-Pacific. This has given rise to a complex web of agreements that also reflect changing patterns of trade around the world, moving away from the traditional North-South co-operation to a greater South-South co-operation environment. This shift also reflects the changing nature of membership of new agreements. Historically, these were „concluded principally among countries at similar levels of economic development, [whereas] they are now negotiated with greater frequency between developed and developing countries“ (United Nations Conference on Trade and Development, 2007, p. 3). The complexity of such arrangements can be seen at Figure 1, in what is now commonly referred to as the ‚Asia-Pacific FTA Noodle Bowl'.

Figure 1 Asia-Pacific FTA Noodle Bowl

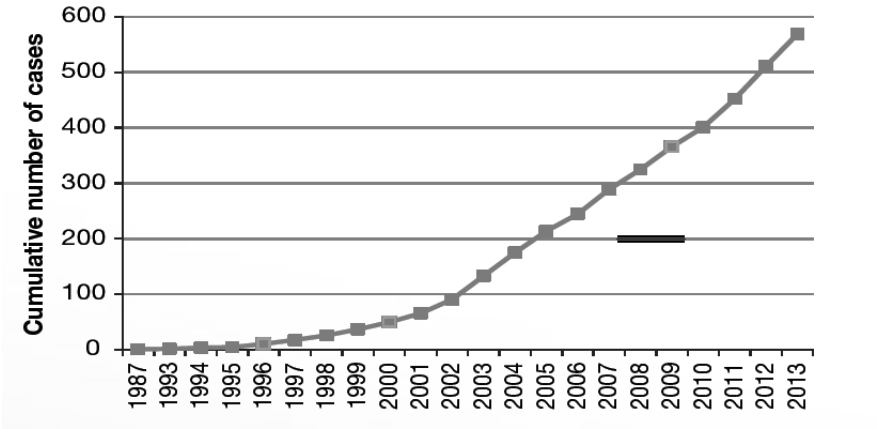


Source: Asia-Pacific Trade and Investment Agreements Database (2013)

The increase in ISDS disputes in the past two decades has been exponential, as shown in Figure 2, creating considerable recent debate in the international trade community, with varying viewpoints about the outcomes of such disputes, with particular concerns over the process of dispute resolution. The major viewpoints are summarised below.

According to Townsend (2013), one of the main issues with ISDS is that they may provide investors with the authority to challenge the laws made in an investor-recipient nation through an international court of arbitration, thereby allowing foreign investors „to by-pass domestic legal systems and have their case heard by an external party“. There a number of tribunals that may hear ISDS processes, including the International centre for Settlement of Investment Disputes (ICSID), the United Nations Commission on International Trade Law (UNCITRAL), and the International Chamber of Commerce (ICC). Referral to an independent third party (ICSID, UNCITRAL, ICC) may well be regarded as a desirable approach under a rogue state or dictatorship, where a fair hearing of the dispute between investor and state is unlikely to occur within that domestic legal system. Under such circumstances, referral to such third parties may be regarded as a reasonable investor expectation. However, Townsend (2013) notes the increasing trend for investors to evoke ISDS clauses by countries with robust legal systems that are neither rogue states, nor dictatorship, such as Australia, for example. In this regard, Townsend (2013) alludes to the plain packaging tobacco dispute that will be discussed in greater detail in the section following the methodology.

Figure 2 Known ISDS Cases (at as end of 2013)



Source: Investment and Enterprise Division - UNCTAD (2014, p. 7)

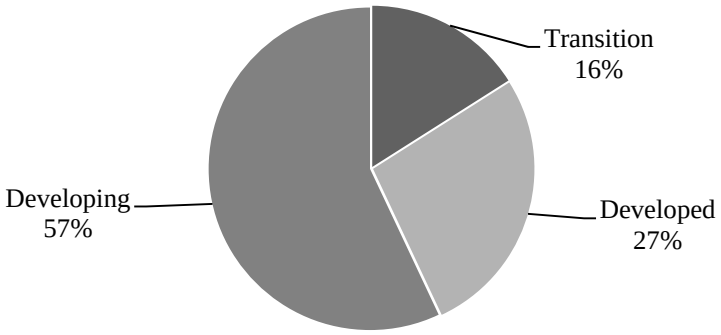
Ikenson (2014) argues strongly against the existence of ISDS, let alone their inclusion in FTA. According to this author, ISDS clauses:

- protect multinational corporations by creating institutions that protect them from the consequences of their business decisions;
- pander to the whims of multinational corporations who receive better then national treatment by virtue of disputing outside national legal systems, and
- encourage frivolous disputes by creative lawyers.

Conversely & Trackman (2012) concludes that government choice of domestic courts "is also about states exercising normative preferences based on macro-economic and political assumptions" (p. 1011). This author argues these assumptions are not valid as governments play both sides of the investment pendulum: on the one hand they want to have their corporations protected in foreign jurisdictions and, on the other hand, they would object to being challenged on domestic soil by a foreign entity, yet there is a need to attract FDI at the same time – there is natural conflict of interest in such an environment, that casts doubt on the ability of government to oppose ISDS clauses in FTA outright.

According to the findings of a study by Bergar, Busse, Nunnenkamp & Roy (2012), the relatively low economic strength of a nation „may indicate that minor host countries were harder pressed to agree to stronger ISDS provisions" (p. 268), ultimately ending up as a respondent. There has been a general skew in cases filed against developing and transition nations, as shown in Figure 3, with these nations accounting for just under three quarters of all cases. To date, the „overwhelming majority (85 per cent) of ISDS claims were brought by investors from developed countries" (Investment and Enterprise Division - UNCTAD, 2014). There is much money at stake in these disputes – the *Al-Kharafi v. Lybya* case was the second highest known award in history at USD 935 million.

Figure 3 Respondent States by Development Status (total as at end of 2013)



Source: Investment and Enterprise Division - UNCTAD (2014, p. 7)

The patterns in Figure 3 may explain a recent refocus on ISDS clauses, where, instead of refusing to consider these outright, a trend appears to be emerging favouring clarification and limitation of ISDS application through better clause re-drafting. This appears to be consistent with patterns that, according to Henry (2013), have emerged within Asia-Pacific Economic Co-operation (APEC) member economies. Henry (2013) concludes economies are paying more atten-

tion to carving out certain areas of public policy such as environmental health and welfare, but „seldom with the full breadth of the WTO GATT and GATS exceptions“ (p. 217). Henry (2013) claims there is evidence that wording of ISDS clauses has considerably harmonised in recent agreements in APEC, but unfortunately this has not extended to strengthening the agreements in such a way as to support consistent outcomes. There is further evidence of clause re-drafting in the Transatlantic Trade and Investment Partnership (TTIP) negotiations by the European Union public consultation process, claiming it will be „introducing modern and innovative provisions clarifying the meaning of this investment protection standards that have raised concern in the past: fair and equitable treatment ... and indirect expropriation“ (European Commission, 2014).

Having provided a concise summary of the most relevant literature, a brief explanation of the method employed in the research follows.

2 Research Method

The method employed for this research is a high level review of Australian FTA implemented over the past decade, and those that have been signed and are awaiting domestic approval for implementation. The aim is to quantify how many of these agreements incorporate ISDS clauses and the extent to which they represent two way trade and investment flows. Based on this information, the discussion focuses on Australia's only experience with an ISDS dispute in over 30 years and the sort of question and issues this has highlighted in terms of future ISDS clauses in FTA negotiations.

3 Research Results

Australia has a number of FTA, most of which have become effective in the past decade. Australia led the world with the historic Australia New Zealand Closer Economic Relations Trade Agreement (ANZCERTA) in 1983, but did not negotiate any further FTA until the start of the century. Table 1 provides a summary of the current operating FTA, as well as FTA that have been signed, but not yet operational, identifying those having ISDS provisions.

Table 1 FTA, Trade and Investment Between Australia and Other Nations

Partner nation(s)	FTA Type	Year	ISDS Provisions	Percentage of Total Trade[3]		FDI AUD Millions[4]	
				Export %	Import %	Outwards	Inwards
New Zealand	Bilateral	1983	No	3,7	3,1	45871	5068
Singapore		2003	Yes	3,4	5,8	8951	25177
Thailand		2005	Yes	1,9	3,9	833	4637
US		2005	No	4,9	12,8	121691	149479
Chile		2009	Yes	0,1	0,4	2126	Not published
Malaysia		2012	No	2,2	3,4	5858	7693
South Korea[1]		TBA	No	7,2	3,2	534	1972
Japan[1]		TBA	No	16,6	6,6	477	63257
ASEAN & NZ:[2] New Zealand Singapore Myanmar Brunei Vietnam Malaysia Philippines Thailand Indonesia Laos Cambodia	Regional	 2010 2010 2010 2010 2010 2010 2010 2010 2010 2010 2012 2011 2011	Yes	11,4 (Excludes New Zealand)	17,7 (Excludes New Zealand)	28240 (Excludes New Zealand)	37505 (Excludes New Zealand)
Totals				40	39,2	214581	294788
Total Trade and Investment Subject to FTA ISDS				16.8	27.8	40150 (18.7%)	67319 (22.8%)

Notes:

1. South Korea and Japan FTA signed, but yet to be ratified domestically – no start date announced yet
2. ASEAN (including New Zealand) is the only Regional FTA signed by Australia to date. This became effective as member nations ratified the FTA domestically. Australia has concurrent bilateral and regional FTA with Singapore, Thailand, Chile and ASEAN-New Zealand.
3. 2012 figures reported
4. 2013 figures reported

Source: Australian Department of Foreign Affairs and Trade and own processing

As can be observed from Table 1, ISDS provisions to date cover the minority of trade and FDI flows, reflecting the negative balance position Australia has with ISDS partner nations. However, Australia also has another 21 Investment Protection and Promotion Agreements (IPPA) with: Argentina, China, Czech Republic, Egypt, Hong Kong, Hungary, India, Indonesia, Laos, Lithuania, Mexico, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Romania, Sri Lanka, Turkey, Uruguay and Vietnam (Department of Foreign Affairs and Trade, 2013). As much of the FDI data is not published, it is not possible to further explore the ramification of these IPPA. However, the only ISDS dispute Australia has been involved in as a respondent is via the IPPA with Hong Kong, that is discussed below.

Australia's single ISDS Experience as a Respondent

On 1 December 2011, the *Tobacco Plain Packaging Act 2011* (TPPA) became law in Australia. This was one of the measures devised by the Gillard Labour government to reduce the rate of smoking, regarded as one of the leading causes of preventable death in Australia. It is important to understand the Australian environment in relation to smoking and general society attitudes towards it, is influenced by laws and regulations. Smoking in Australia appears to be less prevalent and entrenched than in areas such as Europe. Legislation to control smoking in public places has been in force for a number of years. In Australia, it is illegal to smoke in any public place, including: any form of public transport (bus, tram, train, aircraft and taxi); any indoor office space; restaurants; shopping centres; cinema theatres; government buildings; schools, universities and other educational institutions; and hospitals. In other words, where individuals congregate publicly smoking is not permitted. When office workers wish to smoke they have to leave the building and smoke outside. Governments at all levels (federal, state and municipal) have been very active in trying to portray smoking as an unacceptable form of social behaviour, pointing out „the social costs of tobacco exceeded $31 billion in 2005, but it is impossible to put a value on the grief suffered by the hundreds of thousands of families who have lost a child, a spouse or a parent in what should have been the most productive and rewarding years of their life" (Moodie, 2009, p. v).

Against this backdrop, and based on a World Health Organisation recommendation (Tienhaara & Ranald, 2011), TPPA became law, in what is commonly regarded as an example of legislation in the public interest. TPPA requirements for tobacco products are plain paper packaging, with health warnings, but no branding. Trouble with one foreign investor, however, was brewing long before TPPA became law. In fact on 27 June 2011, Phillip Morris Asia (PMA) challenged the Australian government under various articles of the 1993 Agreement between the Government of Australia and the Government of Hong Kong for the Promotion and Protection of Investments (Hong Kong Agreement). The legislation was challenged firstly with two proceedings through domestic courts beginning in 2011. The High Court of Australia (the highest court) on 15 August 2012 found TPPA not to be contrary to s51 (xxxi) of the Constitution. On 5 October 2012 the High Court held „there had been no acquisition of property that would have required provision of 'just terms' under s51(xxxi) of the Constitution" (Attorney-General's Department, 2012).

Whilst domestic court proceedings were progressing PMA submitted a formal notice of arbitration served to the Australian government on 21 November 2011. This process has not yet concluded and documents are not currently available to the public. The actions of PMA have raised concerns, with some pointing out this behaviour seems odd as „the ostensibly American company is engaged in a similar dispute with Uruguay, although in that case it claims to be a Swiss investor" (Tienhaara & Ranald, 2011). The ‚long reach' of the multinational enterprise can be clearly seen in these cases. A subsidiary can be strategically used in pursuing claims, where that is ‚conveniently' located in a jurisdiction that is a party to some form of treaty with ISDS provisions. This not only demonstrates the power and influence of the multinational and its pursuits of profit maximisation as the predominant reason for its existence, but it also calls into question its social corporate responsibility.

The fall-out from the ISDS case has certainly polarised views and challenged the status quo in Australia. The TPPA is legislation for the public interest with a number of benefits, as mentioned above. Smoking causes illness and increases the cost of health care to the community the smokers are part of. The foreign multinational enterprise seems content to reap the rewards of selling tobacco products, as it pursue profit maximisation, but of course is not interested in contributing to the increased health costs the government has to bear, as a result of smoking related illnesses. Instead, the foreign multinational enterprise claims it brings economic wealth to that community because its operations generate employment. Furthermore, when a government tries to reduce smoking for the benefit of its citizens, the foreign multinational enterprise objects and tries to put a stop to this, or else it may hurt its investment. It is difficult to see any consideration of social corporate responsibility principles being applied by the enterprise, quite the opposite.

4 Conclusions

ISDS clauses have gathered increasing prominence in discourses around the world as new agreements are being forged and activists are becoming more engaged and vocal about warning of the dangers, loosely worded, or toofar- reaching, ISDS clauses may bring. The usefulness and legitimacy of ISDS have certainly been brought into question recently, as

ISDS have turned into „arguably the most controversial issue in international investment policy making“ (Investment and Enterprise Division - UNCTAD, 2014, p. 24) .

It is neither easy nor clear to predict what Australia's position will be in the future in terms of including or negotiating ISDS clauses in FTA. The Gillard government, when in power, was adamant that ISDS would no longer feature in FTA, as a result of the PMA case. Of course, as governments change, so do policies, and not necessarily along ideologically predetermined old party-lines. As an example, the Howard Liberal government refused to incorporate ISDS clauses in the US-Australia FTA, but the current Abbott Liberal government has just, rather secretly, agreed to ISDS provisions in the Korea-Australia FTA due to be implemented soon. Although it is claimed these ISDS clauses carve out specific areas, such as pharmaceuticals, it remains to be seen whether enterprising lawyers can work their way around these clauses and potentially undermine government sovereignty.

Ultimately, a better solution than what has so far been devised needs to be found. From the Australian perspective, it is clear that inward FDI is an important part of the economy and a significant source of capital. The difficulty is in achieving a balance between happy foreign investors and putting citizens' interests first. There is a need to attract inward FDI, but this should not be done at any cost, in either the short or long term.

There are significant challenges looming on the horizon for Australia. Negotiations with China are at an advanced stage and the current Australian government wishes to conclude these rather quickly, but secrecy seems to be the order of the day in relation to these negotiations. The danger for Australia is that its economy is very intertwined with that of China in what may be seen as an unhealthy mix. In 2013 Australian exports to China represented 36.1% of total (about 80% of which was primary resources such as iron ore, coal, gold and copper), and imports were 19.6% of total. Australian outward FDI was AUD M6350, but inward FDI was AUD M20832. These figures reflect the considerable investment in energy sectors, particularly mining, that have already been made by China. These have raised concern, for if the buyer (China) controls the supply lines (Australian mines), future export prices will not be controlled from the Australian end. Changes to FDI rules have already been made in response to state owned enterprise investments.

Perhaps a solution may be to devise a standard set of ISDS clauses for global application, with more limited avenues for claims, especially where these may be against public interest. Certainly one recommendation would be to involve the public in open and transparent consultation, as after all, democratically elected governments are meant to be there to serve their constituents.

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Visitor Export in Relation to Economic Impacts of Travel and Tourism in the Capital Bratislava

Ludmila Novacká[1]

Abstract: *The aim of this article is to present the results of economic impacts by the way of visitor exports, it means by expenditure of tourists in Bratislava, the capital of the Slovak republic. The success to achieve the main aim depends on the survey. In present conditions (by available data) is possible to express the total economic impact of direct incomes in the named destination Bratislava. In present circumstances it is necessary to calculate the leakage. In our conditions is possible to count out the value of VAT and local tax. Other leakages related to import of the goods is not possible to calculate because of absence the necessary data. The same problem effects in relation to the savings of the business and the state taxes. The first step presents the survey. By results the total visitor export is in Bratislava average approximately 110 EUR per day/per person. The survey refers high difference of expenditure amount by individual source market. Visitor export survey presents the first step in the process of economic impacts evaluation.*

In generally it is possible to make conclusion and to suggest the hypothesis, that multiplier coefficient of economic impacts could reach value more than 1.

Key words: Travel and Tourism · Economic Impacts · Multiplier · Leakage · Tourist Expenditure · Visitor Export

JEL Classification: D11 · F4 · R10

1 Introduction

After Travel and tourism is the temporary short-term movement of people to destinations outside the places where they normally live and work, and activities during their stay at these destinations with the aim to satisfy the needs. It includes movement for all purposes, as well as day visits or excursions. The satisfaction of the needs is only one-part view. Management of travel and tourism is based on three basic elements. It means economy, environment and social. Speaking about balance of 3BL (sustainable) we have to think that economic issues are very important. It is the reason, why every destination wants to know more exact economic impact of travel and tourism.

The theory is not new. The multiplier models presented by Keynes in 1936 are the basement for theory of economic impact generally and in the area of travel and tourism as well. Economic impacts by multiplier model had been enormously influential in macroeconomic analysis over the last century. Samuelson and other economists proclaimed the thesis, that multiplier model provides a simple way to understand the impact of aggregate demand on the level of output. (Samuelson 1998, p. 462). Many authors do develop the economic impacts in the area of travel and tourism. They are looking to quantify the multiply effects better and more precisely. The proposal to solve the basic problem of leakages they express by formula. Multiplier is the share of proportion of leakages to the unit. This idea is frequent in the books of Holloway, (2006, p. 104), Page & Connell, (2006, p. 351), Mason, (2008, p. 39), Swarbrooke & Horner, (2002, p. 76) and others. Zabajevova & Dracevova (2005, p.76), Beranek (2013, p. 131) discuss, relay and spread the theoretical issue of multiplier by incomes. All authors distinguish the first „direct contribution" of Travel and Tourism to GDP calculated to be consistent with the output of tourism-characteristic sectors (hotels, airlines, tour-operators etc)., the second wider impacts of total contribution" and the third „induced contribution" measures the GDP and direct and indirect employment in travel and tourism industry.

These principles are consistent with the definition of Tourism GDP, specified in the 2008 Tourism Satellite Account: Recommended Methodological Framework (TSA: RMF 2008). The methodology, applied by World travel and tourism Commission (WTTC) do´es classify calculations of these categories:

- Visitor exports
- Domestic expenditure (includes government individual spending)
- Internal tourism consumption
- Purchases by tourism providers, including imported goods (supply chain)
- Direct contribution of Travel and Tourism to GDP
- Other final impacts (indirect and reduced) + domestic supply chain

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- Capital investment
- Government collective spending
- Imported goods from indirect spending
- Induced
- Total contribution of Travel and Tourism to GDP
- Employment impacts, direct contribution of Travel and Tourism to employment
- Total contribution of Travel and Tourism to employment
- Other indicators, expenditure on outbound travel

This methodology is applied by WTTC for analyse of economic impact of travel and tourism in the world, in the Europe, in world´s and European regions and in individual states. This is the highest level of this model. The regions inside the states or the towns have to solve the quantification of economic impacts. The basic problem is absence of the data's, because of hard and expensive collecting. The aim of this article is to present the results of economic impacts by the way of visitor exports, it means by expenditure of tourists in destination Bratislava – Slovakia.

2 Methodology

The success to achieve the main aim depends on the survey, partial aim. Survey created and established conditions to recognise the expenditure of the visitors in destination Bratislava. Author decided to reach foreign visitors. It was the way to express the visitor export. This category of data's present, the first step named by methodology WTTC.

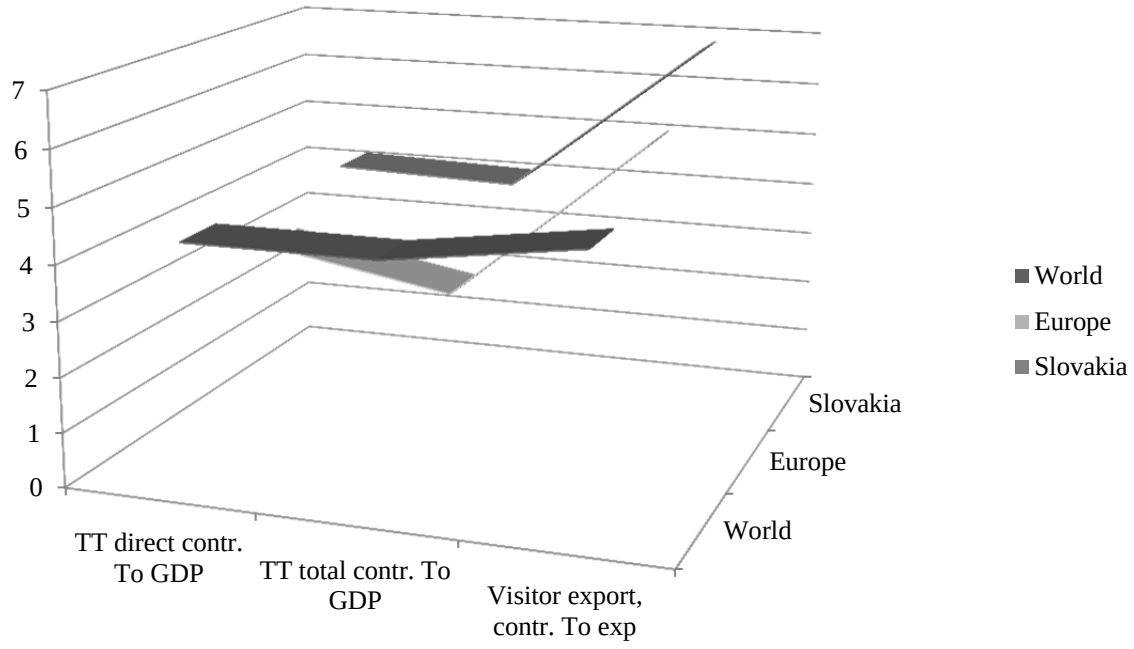
The author applied methods of primary and secondary research. The primary research was done in the year 2013 by questionnaires. Bratislava´s research involved 2300 questionnaires in 6 language variants. This survey doe´s follow the preliminary survey done six month ago in the number 680 questionnaires. Analyse, synthesis, deduction, induction, brain storming, statistics methods had been applied in the framework of secondary research.

3 Results and discussion

Economic impact of travel and tourism by WTTC study presents economic impacts of GDP direct contribution, GDB total contribution, Employment direct contribution, Employment total contribution, visitor exports and investment.

In our article we disseminate the basic data's related to GDP and visitor exports. Visitor exports are the main topic of our survey provided by authors in the destination Bratislava.

Figure 1 Real growth of the tourism impacts in the year 2014



Source: WTTC (2014a, 2014c, 2014d)

Table 1 Real growth of the tourism impacts in the year 2014

	World	Europe	Slovakia
Travel and tourism direct contribution to GDP	4.3	3.4	4.2
Travel and tourism total contribution to GDP	4.3	2.8	4.1
Visitor exports, contribution to exports	4.8	5.8	6.9

Source: WTTC (2014a, 2014c, 2014d)

Table 2 Long term growth forecast 2014 – 2024 in %

	World	Europe	Slovakia
Travel and tourism direct contribution to GDP	4.2	2.9	3.3
Travel and tourism total contribution to GDP	4.2	2.8	3.2
Visitor exports, contribution to exports	4.2	3.7	4.2

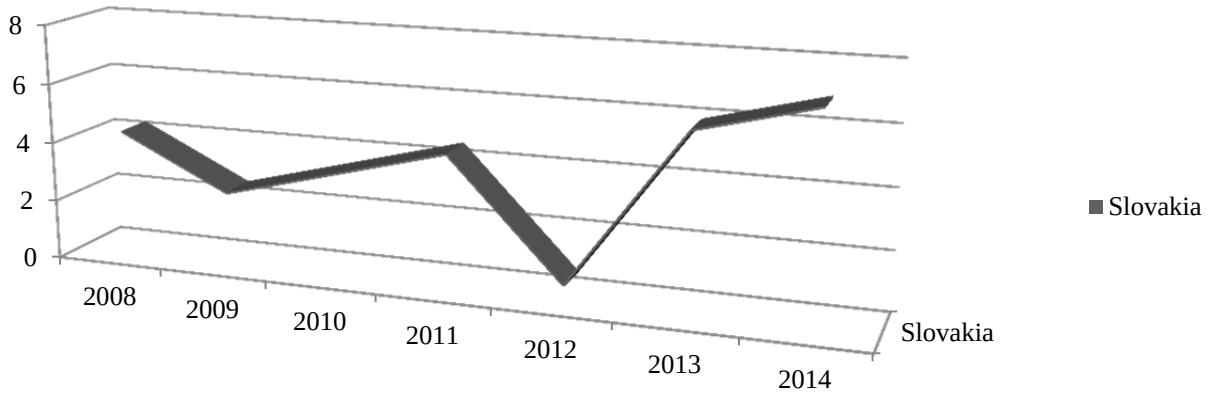
Source: WTTC (2014a, 2014b, 2014c, 2014d)

Table 3 The economic contribution of travel and tourism: Growth – visitor exports in %

Country	2008	2009	2010	2011	2012	2013	2014
Slovakia	15.7	-10.1	-5.7	0.8	0.6	5.9	6.9

Source: WTTC (2014a)

Figure 2 The economic contribution of travel and tourism: Growth – visitor export in %



Source: WTTC (2014a)

Bratislava is the capital of the Slovak republic. The number of foreign tourist overnights in Bratislava in the year 2013 = 947 730. The survey in Bratislava done in the year 2013 documents the expenditures of foreign tourists, in other hand the incomes of business.

Table 4 Foreign tourist's expenditure per day (visitor export)

Tourist flows	Total ∑exp. in Bratislava excl.transport to BA	Total ∑exp. in Bratislava incl.transport to BA
All foreign	111.32	167.39

Resource: author

Table 5 Conditions for visitor export in Bratislava

Destination	Number of over-nights in the year 2013	Expendi-tures/per day €	Total visitor ex-ports €	Leakage VAT %	Leakage local tax €
Bratislava	947 730	111.32	105 501303.6	20	1.65

Source: author

The average tourist´s expenditure per day (visitor export) excluding transport to Bratislava reached the level 111. 2 EUR. The great differences by the market source documents the table 6.

Tabble 6 Average expenditure of foreign visitors per day by source markets in Bratislava (visitor export)

Source market	Asia	Austria	Czech Rep.	France	Germany	Hungary	Italy
Expenditure in €	136.69	91.87	77.76	118.35	100.86	74.75	149.13

Source market	Poland	Russia	Spain	South America	UK	USA
Expenditure in €	77.63	260.43	73.58	89.55	154.38	81.91

Source: authors

The visitor export is in average approximately 110 EUR per day/per person. High difference in the amount of expenditure by source markets is usual. Many determinants form effect in the process of consumer behaviour and spending of money.

4 Conclusion

In relation to named data's we can formulate the conclusion. In present conditions (by available data) is possible to express the total economic impacts of direct and indirect incomes in the named destination Bratislava incompletely. With the aim to quantify the visitor export more clearly and more transparently, it is necessary to calculate the leakage. In our conditions is possible to count out the value of VAT and local tax. These categories represent the income for state (VAT) and income for the municipality (local tax).

Table 7 The leakage VAT and local tax

	Total visitor exports €	Leakage VAT+ local tax
Bratislava	105 501 303.6	22 664 021.70

Source: authors

Other leakages related to import of the goods is not possible to calculate because of absence the data. The same problem is important in relation to the savings of the business and the state taxes. The first step of total visitor exports presented by our survey suggests the general hypothesis, that multiplier coefficient could reach the value more than 1.

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The Implementation of the Mobile Sales Force Automation

Dita Hommerová, Kateřina Vondrová[1]

Abstract: *The topic of this paper is one part of the operational CRM – "sales force automation", which is a system used by the sales force in a company to facilitate the flow of information from the end customer to the company. The purpose of this paper is to confirm or disprove the presumption that the implementation of the sales force automation has a positive effect on the company's results. Various international research studies are analyzed to accomplish this. In addition the paper discusses the most frequent issues while implementing the system and suggests factors ensuring successful implementation.*

Key words: Sales force automation · Operational CRM · Sales Force · Implementation Efficiency

JEL Classification: M31 · M15

1 Introduction

Sales representatives are the only people in a large company that are able to collect data and spread information about customers further into the company as they have direct relationships with customers. Therefore it is necessary to aim at the fact whether the communication and mainly collecting, storing and spreading information within the company takes place effectively. One of the possibilities how to ensure this effectiveness is the so called "Sales Force Automation" (SFA) or the so called "mobile Sales Force Automation" (mSFA), or, in short, sales automation.

1.1 The definition of the mobile Sales Force Automation

The notion of "Sales Force Automation" expresses any form of information technology that is used at the moment of sales and it enables or facilitates accomplishing the mission of selling a product (Hunter & Perreault, 2006). Sales Force Automation is software installed in a mobile computer of the sales representatives. These software applications are either developed by the companies´ own IT staff or by means of outsourcing the relevant application development or by ready-made packages of software solutions that are already available on the market. Each of the above possibilities of acquiring the software has its advantages and disadvantages. Most often the system features the following functions: it administers the information about customers, it allows sales representatives to complete the information as necessary, it organizes the job content of the sales representatives and it ensures that customers are always visited according to their importance and it also assigns work to the sales representatives. The system is linked with the CRM system, and it enables the sales force to be linked with other segments of the company or it may provide information about the supplies in stock.

1.2 Prediction of mSFA´s future

US companies started to implement mSFA software applications at the beginning of the new millennium. Frost & Sullivans Agency in its "Mobile sales force automation (SFA) markets report" from the year 2013 *assumes 232% growth of sales on the mSFA market in the year 2017 as compared with the year 2012* (CRM Magazine, 2013).

2 Methods

The aim of this article is to introduce the issues of the sales operation automation, to find out about the results of the expert studies related to the mSFA effectiveness (literary review) and to analyze the most frequent problems in the process of implementation. Owing to the set objective it will be analyzed whether the following assumption is valid:

Presumption 1: Sales automation has a positive impact on the company operations.

3 Research results

3.1 Frequent problems in the SFA implementation

Gohmann, Guan, Baker & Faulds (2005a) remark in their article that there is a difference in perceiving the effectiveness between managers and the sales team itself. Managers often incline to the fact that they consider the automated systems

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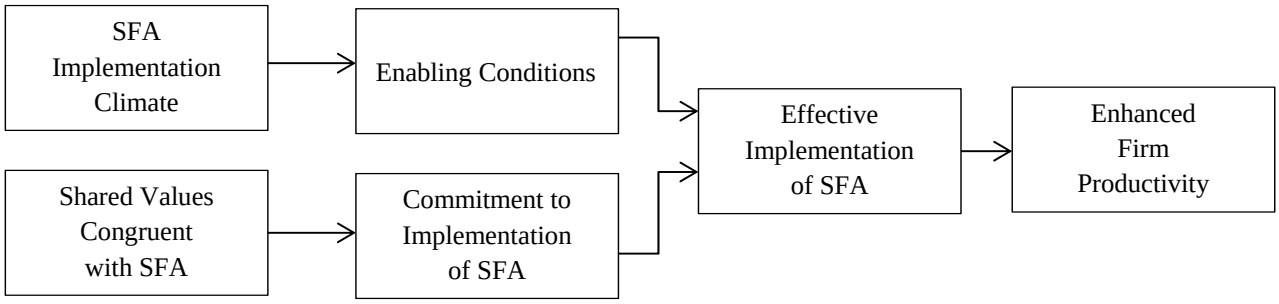
successful, which is often caused by intentional or unintentional "short-sightedness" within the company processes. This expression cannot be heard as often from the point of view of the sales teams. The authors Scornavacca & Sutherland (2008) came to the same conclusion. In their study from the year 2008 they analyzed a New Zealand company supplying fast-moving goods, such as chocolate bars, biscuits and chewing gums to convenience stores, supermarkets and petrol stations. One business manager was responsible for a team of 20 sales representatives. It turned out that the manager saw the implementation of SFA as a positive influence on the sales amount. Unlike him, the sales representatives were not convinced about the fact that the technology could sell more goods and make customers buy more products. The sales representatives agreed with the fact that SFA could not replace a personal relationship with a customer and it does not provide better knowledge of the market as this knowledge is only based on personal experience with selling on the market. In this respect they did not agree with the manager either.

The above described example of the New Zealand company dealing in fast-moving goods outlines the main reason why the system implementation often fails. *The most frequent problem is the fact that the users (company employees) do not accept the system and do not start using it actively***.** Robinson, Marshall & Stamps (2005) in their study claim that the more useful the system is for the users and the easier it is to apply, the more open attitude is taken by the users to master such a new technology. Other authors dealt with the reasons why the sales representatives were open, or, on the contrary, closed towards the technology implementation. A study from the year 2006 on this topic states that, for example, people who are oriented towards performance and result and people who like learning accept the new technology more easily (Jelinek et al., 2006). It seems that the technology can really simplify the sale by itself. The change management, i.e. mastering the transition to the new system is a bigger problem here. The company should, of course, provide for sufficient time to the choice of the system and even more attention should be paid to the preparation and the process of the implementation of the new technology as these are the stages that are underestimated most frequently.

3.2 Ensuring successful implementation

What is then the best way, as seen from the managers´ point of view, to ensure that the system can be put in operation successfully? Pullig et al. (2002) created a model describing the conditions necessary for successful implementation of the new technology for the sales representatives. The following figure shows the prerequisites for such implementation to be successful.

Figure 1 SFA implementation model



Source: Pullig (2002, 401-414)

In their research the authors set 2 factors having influence on the success of the SFA implementation:

1. **Suitable climate** – this means that the future users of the system will be provided such conditions that will enable them to master the system soon. Sufficient training how to use the system must be provided. It is just the insufficient training meant to teach how to apply the technology that is the most frequent reason for the failure. Managers´ approach is another factor. They should provide sufficient organizational support and they should always try to facilitate their subordinates´ work, or, as the case may be, they should offer some bonuses for using the system. The subordinates should always be convinced about the system benefits.
2. **Values that the company acknowledges** – the company must acknowledge some values to be able to implement the automated system successfully. The company must be customer oriented and it must highlight a long-term perspective of the company-customer relationship. The company must be able to respond to changes flexibly. The company must have such a system established where the individual departments cooperate among one another and they share information. Even mild competition between the individual workplaces may be an obstacle in the successful implementation of the system. This, however, is often the case with numerous companies.

The authors assume that the combination of the two factors described above. i.e. the suitable conditions for the implementation and the suitable values shared across the company may provide for the effective implementation of the SFA system. According to this model, effective implementation is completed if the company achieved such a state in which employees use the system in the extent that had been set as the objective at the very beginning. If the objective is met, the company may fully use the benefits that SFA brings. Successful implementation of the SFA system will, according to the authors, ensure the following:

1. **Sufficient linkage of the company with customers and the market.** This will enable collecting information about customers, competition and other links of the chain. This way the company may offer customers the added value in the form of better services, for example in the system of executing orders. At the same time the customers´ needs and wishes are understood better across all the organization.
2. **More knowledgeable and competent sales force** and the staff able to ensure the supporting functions.
3. Customers are provided with **more accurate information about the products.**
4. **Shorter delivery terms.**

In order to either confirm or disprove the presumptions the authors of the article carried out a research study in which 23 sales representatives, business managers or marketing managers from different fields in the South eastern part of the United States. All the respondents had some experience with using the SFA systems.

Several interesting results came out of the qualitative analysis. Managers, to a large extent, thought that as far as the employees are concerned it is necessary to build (or if the employees are newly recruited to require) good “computer literacy” and they should also be team players. In this field the authors accord with the other professional literature. When choosing employees to a sales team it is critical for the sales force to be open to new technologies and to be innovators by nature (Mathieu et al., 2007).

Rouziés (2005) aptly depicts the main fact that must be ensured when selecting the SFA technology. As the sales representatives are generally famous for being impatient as far as learning and using information technologies is concerned, and they feel more “at home” with their customers than in front of a PC, the technologies must, first of all, be easily applicable and user friendly.

Jelinek (2013) responds to the surprising finding of the Accenture company (Accenture 2012) that only 15% of companies succeed in SFA implementation. According to the author it is, in applying SFA, necessary to stick to the Pareto principle 80/20, when the author claims that 20% of the SFA system functionalities create 80% of the results and the sales representatives are not trained in such a way as to use the “right” 20%.

Another finding is that because of the fact that companies try to motivate salesmen to use SFA, the sales representatives often expect the results to appear too soon. This causes the atmosphere that if the improved results do not appear instantly, the sales representatives are discouraged and they stop using the system. But in fact the core of such a system consists in collecting data about customers over a period of several meetings between a sales representative and a customer. Only when all the data is collected it is possible to apply it. Managers should therefore stress the necessary patience with the system and highlight the significance of the long-term usage and of the effects of the system application.

The study carried out in the year 2001 on a sample of 56 American companies analyzed the most frequent problems in the implementation of SFA that appeared unexpectedly. For 20% of companies the costs of staff training were higher than expected. 15% of companies reported unexpected problems with the hardware or software. With 15% of companies the turnover of the sales representatives increased significantly. With 10% of companies the sales representatives were resistant to the change. Managers, to a large extent, claimed they should, before the implementation, have considered the consequences of SFA in the company more thoroughly. They recommended creating a “multidisciplinary” team for planning SFA, i.e. to include employees from different departments of the company into planning. The sales representatives themselves should have a possibility of expressing their opinions in the stage of planning. If they could participate in the decision making, the implementation of the new technology would be far simpler as they would have the feeling that the technology at least partly corresponds to their ideas. It is also advisable to carry out research among the customers of the company to find out whether the given system would be acceptable for them and if they were willing to participate by, for example, providing information to help facilitate the implementation of the system.

Companies that decide to transfer to the SFA technology should also consider the following fact. The sales representatives are, to a large extent, influenced by the fact how they perceive the accuracy and the verity of the data collected by means of SFA (Gohmann et al., 2005b). Managers should, therefore, aim at the fact that sales representatives are provided with such data that they perceive as useful and applicable for their work – selling products.

Rouziés (2005) brings another finding. Sales representatives and marketing employees should not have the feeling that SFA serves mainly to monitoring and inspecting their work. Therefore SFA should be devised in such a way that it facilitates the salesmen´s work and it is also perceived like this.

3.3 Effectiveness of the mSFA implementation

The opinions on the influence of mSFA on the company efficiency vary. The following chapter will therefore pay attention to the methods of measuring the effectiveness of the mSFA implementation.

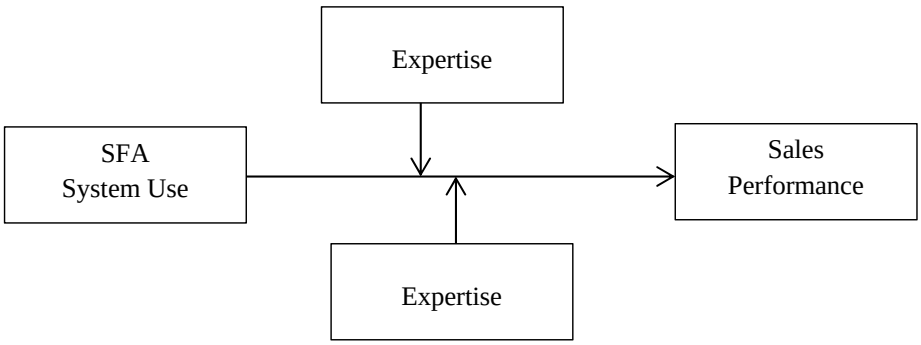
The existing research of the influences of mSFA on a company includes two types of results (Moutot & Bascoul, 2008):

1. **The results oriented towards customer** – these research studies look for the connection between the implementation of mSFA and the satisfaction of the customer or the amount of sales (if the customer is satisfied, he/she will probably order more).
2. **The results oriented towards company** – these research studies look for the connection between the implementation of mSFA and the effectiveness of the internal processes of the company.

The following paragraph brings the results of the surveys oriented towards customer (point 1).

- Avlonitis & Panagopoulos (2005) – This research study analyzed the conditions necessary for the successful adoption of mSFA by the sales representatives and also the influence of the adoption of mSFA on the sales force efficiency, which was measured by four quantities: volume of sales, market share, number of acquired new customers and the ability to maintain relationships with the existing customers. The model was based on the responses from 240 sales representatives using the information system. The conclusion of the inquiry is that there is no direct connection between the adoption of mSFA and the increased efficiency of the sales force.
- Dennis & Ko (2004) – the authors carried out a study in an international pharmaceutical company Farmaco. The study is based on the information from 1,340 sales representatives of this company. The authors analyzed three mutual connections. The following figure shows the fields of analyzing this model.

Figure 2 Research model



Source: Dennis & Ko (2004)

The aim of the model was to find out whether applying mSFA increases the individual efficiency of the sales force and what influence the expert knowledge and experience of the sales force has on the relationship between using mSFA and the efficiency of the sales force. It was found that the more the sales force used mSFA the more knowledge they gained and the better their individual efficiency was. The salesmen, nevertheless, varied in the extent in which they were able to profit from using mSFA. With less experienced salesmen the benefit of mSFA was bigger than with those who had already had a lot of experience before introducing mSFA. Similarly, the salesmen who had achieved excellent results with using mSFA benefited from using mSFA less than those who had achieved average or worse sales results.

- Jayachandran et al. (2005) – The study analyzes if the implementation of the CRM technology, to which mSFA belongs, improves the relationship with customers. The analysis confirms that applying the technology contributes to good relationships with customers as it reduces the administrative burden.
- Keillor et al. (1997) – The authors carried out a questionnaire survey on a sample of 129 sales representatives from different fields. The results show that the more experienced sales representatives have the biggest problem with the adoption of SFA. This may be caused by the fact that the experienced sales representatives are often older than the less experienced sales representatives. Younger employees are generally more open to new technologies than older people. The survey also shows that SFA increases productivity of the sales representatives. What is meant by productivity here is the amount of turnover per head and per year. The implementation should, according to the authors, increase the sales of a company. The study also points out that SFA is also a tool by means of which the inexperienced staff can be trained for the job quickly, which enables ensuring professionalism of the sales force faster than without the information technology.
- Mithas et al. (2005) – On the basis of data collection from 300 companies in the United States the study analyzes the relationship between the implementation of CRM information system and two variables representing the customer

satisfaction and the knowledge of the customers from the company point of view. The authors consider the knowledge of the customers, i.e. observing the buying behaviour and discovering the needs of customers to be the main motivation why companies invest in the CRM technologies. The results show that the CRM technologies (including SFA technologies) increase the knowledge of customers from the company point of view only in case when the company shares the information about customers in all its supplier chain. Understanding the needs of the customers then leads to increased satisfaction among customers.
The following paragraph brings the results of the surveys oriented towards the company:

- Erffmeyer & Johnson (2001) – This study is based on the data gained from 56 American companies. A manager responsible for SFA operation was chosen from each company. A personal in-depth interveiw was carried out with each manager. The research analyzes possible positives and negatives that SFA brings to the company. Managers mentioned mainly the following benefits for the company.

  - Better access to the information about customers
  - Higher effectiveness of company processes
  - Better communication with customers
  - Faster sales generation
  - More accurate sales forecast

  The following negative effects were defined by managers in connection with SFA:

  - Lengthy training of users
  - Problems in the implementation stage
  - High investment for purchasing SFA technologies
  - Frustration of sales representatives
  - Constant necessity to update the information system and related further costs

- Speier & Venkatesh (2002) – The authors collected data from 454 sales representatives in two companies which implemented mSFA. The model analyzes whether the sales representatives adopted or refused mSFA and the influence of the adoption or refusal on the efficiency of the sales force. The results of the research show that right after the implementation of mSFA and after being trained the sales force perceived the technology positively. Contrary to the above, six months after the implementation the technology was refused by the sales force. The bad attitude towards the technology became evident mainly in the increase of the number of absence from work and in a higher number of voluntary notices. After six months the sales force felt a lower level of commitment towards the company, they did not identify themselves with their work and with the company as before and generally, they were less satisfied with their work.
- Rouziés et al. (2005) – The authors see the economy of time as the main benefit of SFA as the system automatically provides the exchange of data, mainly between the sales and marketing departments.
- Robinson, Marshall & Stamps (2005) – The authors agree with other studies on the fact that if the sales representatives adopt the technology, its long-term application increases sales.
- Ahearne, Jelinek & Rapp (2005) – The biggest problem with the implementation of SFA – the adoption from the part of the sales representatives - is confirmed again. The authors prove by their study that using SFA improves the effectiveness and efficiency of the sales representatives. The effectiveness is understood in the study as fulfilling the plan of sales in percentage and the efficiency is understood as a number of telephone calls to customers in one day. The research also proves that the technical support provided to users and sufficient training contributes to increasing both the effectiveness and efficiency.
- Brown & Jones (2005) – According to this study SFA facilitates the flow of information within the company and like this it improves communication between the individual sales teams (for example regional teams). A better exchange of information should help the sales force to become more effective in fixing appointments with customers and in adapting offers according to the needs of the customers.

4 Conclusions

The above stated studies and surveys analyzing the consequences of the implementation of mSFA used either measurable or non-measurable factors. If these were measurable factors, the consequences of the implementation of SFA were assessed by the amount of the company sales, the market share, the number of newly gained customers, by the individual efficiency of the sales representatives (the goods sold by the individual salesmen), by the amount of absence of work, by the number of voluntary notices, by the time spent by passing over the information about the market further into the company, by fulfilling the plan of sales in percentage or by the number of telephone calls to customers in one day, On the contrary, some studies used non-measurable factors, such as satisfaction of customers, the knowledge of customers from the company point of view, the assessment of the communication with customers or by perceiving the technology

by the sales representatives. The measurable factors were inquired by questionnaires, the non-measurable ones by in-depth interviews. Out of the 11 above stated studies 8 studies proved a positive influence of the implementation of SFA (independently of the units of measure), 2 studies proved a negative or neutral relationship and 1 study analyzed both positive and negative aspects and it did not resort to an unambiguous conclusion. *It is therefore possible to state that most authors agree on the positive consequences of the implementation of SFA for a company***.** The presumption number 1 which was defined at the beginning of the article stating that the sales automation has a positive impact on a company operation has therefore been confirmed.

Each company has its own specific features which must be considered in the stage of the decision making whether to implement the new technology or not. The new technology may work very well in one company but in another company the results may not be positive at all. It is therefore always necessary to judge the existing situation and the type of the company and the market on which it operates and to consider the information when making decisions about the implementation of SFA.

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Strategic Vision of Sustainable Tourism Development: Municipality of Strážný 2020

Petr Štumpf[1]

Abstract: *Strážný is a small town, which is situated directly on the border between the Czech Republic and Germany. The image and the public perception of the town are strongly influenced by factors connected with negative sociopathological phenomena such as criminality or prostitution. On the other hand, Strážný is surrounded by unique landscape and nature of the National park Bohemian Forest (Šumava). The competitive advantage in terms of Strážný as a potential tourism destination, lies in the strategic position and good accessibility on the main road between South Bohemia and Lower Bavaria. It is necessary to plan the future development of the town as a sustainable tourism destination. The area of National Park Bohemian Forest is one of the most popular tourist region in the Czech Republic, but the town of Strážný is not a favourite place for visitors in this time. Due to this fact, and thereby also due to the lack of the data about visitors from the past, the Delphi technique was chosen as a method for forecasting the future of the town as a tourism destination to propose the strategic vision, mission statement and strategic objectives. This method helped to find a consensus among stakeholders in the town and to discover common aims of all participants of the future development of Strážný as a tourism destination.*

Key words: Tourism · Local Development · Strategic Vision · Delphi Method

JEL Classification: L83

1 Introduction

Strážný is a small town, which is situated directly on the border between the Czech Republic and Germany. The image and the public perception of the town are strongly influenced by factors connected with negative sociopathological phenomena such as criminality or prostitution. On the other hand, Strážný is surrounded by unique landscape and nature of the National park Bohemian Forest (Šumava). The competitive advantage in terms of Strážný as a potential tourism destination, lies in the strategic position and good accessibility on the main road between South Bohemia and Lower Bavaria, which makes a connection between the important towns of this region - České Budějovice and Passau. It is necessary to plan correctly and very carefully the future development of the town as a sustainable tourism destination. The area of National Park Bohemian Forest is one of the most popular tourist region in the Czech Republic. However, the Town of Strážný, due to the negative perception and the lack of tourism infrastructure, is not a favourite place for visitors in this time, despite the fact that the history and natural potential of this area are very high. Due to this fact, and thereby also due to the lack of the data about visitors from the past, the Delphi technique was chosen as a method for forecasting the future of the town as a tourism destination to propose the strategic vision, mission statement and strategic objectives for the planning period 2014 - 2020. This method helped to find a consensus among stakeholders in the town and to discover common aims of all participants of the future development of Strážný as a tourism destination.

1.1 Sustainable tourism in a destination

Sustainable tourism is defined as tourism that is economically viable, but does not destroy the resources on which the future of tourism will depend, notably the physical environment, and the social fabric of the host community (Swarbrook, 1999 In. Ritchie, 2003). Nasser (2003) comes with a similar definition. He adds, sustainable tourism is rooted in sustainable development, in the sense that if tourism is to contribute to sustainable development, it must be economically viable, environmentally sensitive, and culturally appropriate.

Tourism cannot be sustainable in its own right but may contribute to the sustainable development of some regions under some circumstances. (Moscardo, 2008) Farrell & Twining-Ward (2004) deal with a global change of tourism concept and the role of sustainability in this concept. *Understanding of sustainability has shifted from the notion of a stable achievable goal, to the concept of transition based on multiple spatial and temporal scales in a dynamic landscape of evolving human values.* (Farrell & Twining-Ward, 2004, p. 288)

Hall (2006) mentioned one of the most important aspects of sustainable tourism development when he claimed, the industry of tourism focused on and declaration of sustainable tourism related to activity at the destination. Rarely is attention drawn to the usually unsustainable transport and travel modes – aircraft, motor vehicles – that many tourists necessarily employ in order to be able to visit destinations.

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Paskaleva-Shapira (2007) and Holesinska (2012) confirm the relationship between sustainability and competitiveness with a tourism destination management. Every destination must examine its ability to maintain all dimensions of sustainability (environmental, economic, social, cultural and political) if it is to develop and preserve true competitiveness. „*Competitiveness without sustainability is illusory*." (Ritchie, 2003, p. 49)

Dwyer et al. (2009) deal with global trends, that should be implemented by destination management in the frame of sustainable development in a tourism destination: 1) Yield per visitor more important than numbers; 2) Economic-environmental trade-offs necessary; 3) Consumers should be educated to purchase tourism products which match environmental constraints; 4) Tourism development by and for community residents. Ritchie (2003) even uses a term „the sustainable destination" for these types of tourism areas. The situation when tourism destinations, in long-term period, do not sustain all factors of their key potential and these, which are oriented only for short-term profit, is called myopia in sustainable tourism. Profitability of a destination is measured by a profit from one tourist rather than the quality of natural environment. These paths will lead to the long-term destruction of the environment and thereby to the depreciation of the tourism industry attractiveness in the destination for the future.

We can state that the emphasis on the management of a sustainable tourism destination can enhance the economic performance and competitiveness of the destination and, at the same time, new tourism development respects needs of local communities and the natural environment. (Novacká, 2010)

1.2 Strategic planning and strategic documents of tourism development in a tourism destination

Rodriguez-Diaz & Espino-Rodriguez (2007), understand tourism destinations as being complex systems that need planning and modelling to improve their overall management. Their model of strategic evaluation of a tourism destination includes different factors affecting the competitiveness of destinations. These are then evaluated according to their internal and relational strategic value. Their empirical study shows that the tourism supply chain is the destination's focal point and develops its operations according to a destination's resources. In this context, the geographical, environmental, and sociocultural factors, the service companies factor, the political factor, and public infrastructure are all essential to define a destination's singularity and its ability to attract tourism.

According to Soteriou & Coccossis (2009), for strategic destination planning, it is necessary to integrate sustainable development principles and show how to integrate these principles into the strategic planning process. These factors fall into three categories; namely: 1) exogenous factors (sustainable development strategy), 2) organisational factors (resources and commitment of top management team factors), and 3) system design factors (internal and external orientation, use of appropriate tools, participation, comprehensiveness, functional integration, level of consideration of sustainability in strategic planning).

In German-speaking areas, authors, such as Bieger (2008), Freyer (2004) and others, further define the "Tourismusleitbild" (enlarged mission statement of a tourism destination) and "Destinationstrategie" (destination strategy) as the basic tools of strategic planning for the development of tourism destinations. These tools cannot run independently, but must be implemented in a hierarchy between superordinate documents and subordinate business plans. The Tourismusleitbild, as a strategic document, crossed the political (= normative) level, the implementation of specific activities of tourism organisations (= strategic level) and business activities (= operational level).

A general strategic document was, primarily, formulated as a basic tool for destination planning in the phase of tourism growth. The document was not specific and contained only vaguely defined directions of tourism development in the destination. The specific destination marketing concept was further developed from the basic document. (Bieger, 2008)

Vystoupil et al. (2007) and Holesinská (2007), focus on the issue of strategic and tactical documents of tourism development in the Czech Republic. Vystoupil et al. (2007), show specific features that appear in the issue of tourism documents in the Czech Republic. The concept is becoming more detailed and, so, takes on the characteristics of a plan.

Generally, the aim of a destination strategy is to build and maintain its competitiveness in the tourism market. It provides information about how to achieve a sustainable competitive advantage through the identification, development and utilisation of key competencies; how the destination may be profiled in the market; and in which markets it wants to present and with which products. (Bieger, 2008)

In destination planning, it is also necessary to predict future developments and trends in the tourism market. This is recognized by Formica & Kothari (2007), who argue that the formulation of a destination strategy is directly related to forecasting future events and their impact on a destination.

1.3 Delphi technique as a tool for strategic planning in tourism

The Delphi method of forecasting has attracted considerable attention in the tourism. This technique aims to obtain expert opinion about the future through questionnaire surveys of a group of experts in the field, and is particularly useful for long-term forecasting. (Moutinho, 2000)

The Delphi technique belongs to a set of qualitative research methods that rely on the judgment of individuals presumed to be experts in the subject under consideration. Delphi technique represents a very flexible research method, and one that can lend an added dimension of rigor to addressing the kinds of questions and issues that are difficult to research using more conventional methods. Delphi technique is a method in which experts provide further insight into the nature of the topic of interest that would otherwise be unavailable to the researcher. (Ritchie et al., 2005; Woodside & Martin, 2008)

Delphi studies are carried out anonymously in order to minimize conforming influences; thus, rather than meeting physically to debate the various issues under consideration, the experts are kept apart so that their views are not affected by dominant personalities, social pressure, etc. Delphi studies involve several iterative rounds, and at each stage the derived group opinion is fed back to the participants in the form of the range and distribution of responses. The panel members are requested to re-evaluate their previous replies in the light of the summary group opinion and to justify any answers which would still differ greatly from the overall group opinion. The experts are thus able to try to convince one another about their views. (Moutinho, 2000)

Ritchie (2003) deals with Delphi technique as one of the most popular and most effective approaches, currently in use for policy formulation, planning and research in tourism. Delphi technique is a method for decision support, prevention and solving of specific problems and can be also used for formulating the strategic vision of a tourism destination or defining the strategic objectives and action plans. (Vystoupil et al., 2007)

The advantage of the Delphi approach over other consensus of expert opinion forecasting approaches where participants do meet needs to be balanced against the disadvantages of being unable to engage in debate with the other experts in order to exchange ideas, clarify points, etc. and the fairly long time period required to carry out the exercise. (Moutinho, 2000)

2 Methods

The research is based on Delphi technique as a qualitative research method. The Delphi technique was chosen as a method for forecasting the future of the Town of Strážný as a tourism destination to propose the strategic vision, mission statement and strategic objectives. A panel of 10 experts drawn from the important organizations, entrepreneurs or municipality deputies (see Table 1) was put together for the purposes of the Delphi study. The research was carried out anonymously per on-line questionnaire in order to minimize conforming influences. The experts involved in the panel ware kept apart so that their views could not be affected by one and other.

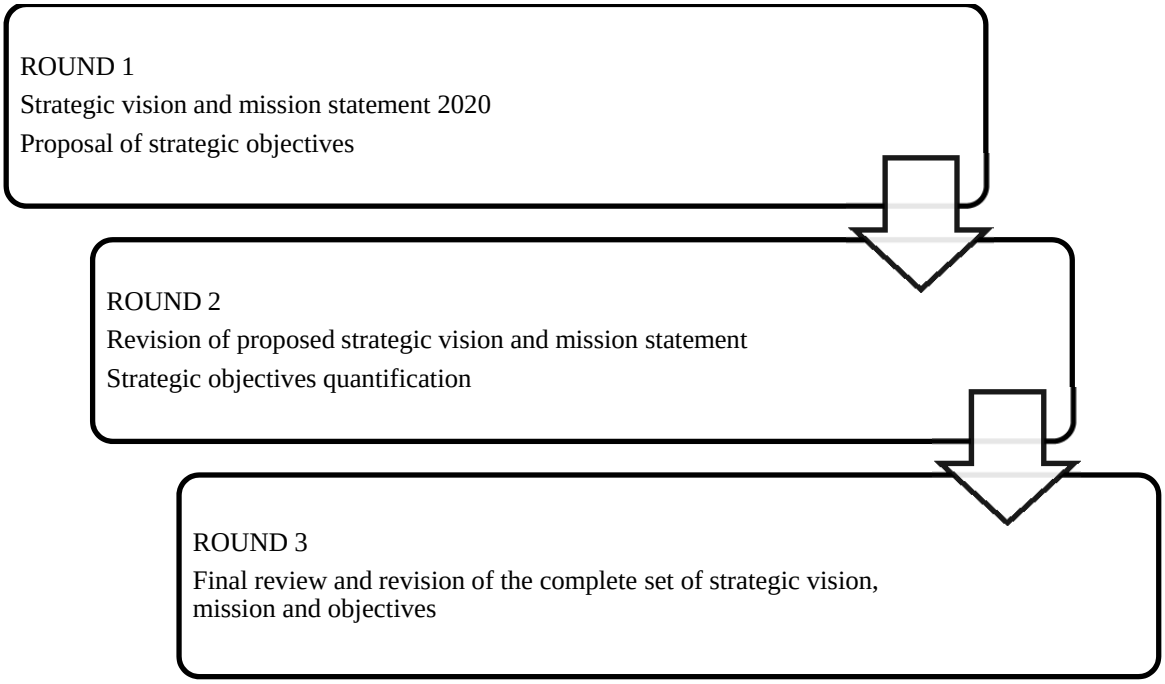
Table 1 Panel of experts for the Delphi study

INSTITUTIONS	NUMBER OF PARTICIPANTS
Czech Tourist Board (CzechTourism Agency)	1
Local entrepreneurs	2
Management of the National Park Bohemian Forest (Šumava)	1
Ministry of Local Development of the Czech Republic	1
Municipality of Strážný	2
Novi Solutions (regional consulting company)	1
Regional Authority of South Bohemia	1
University of South Bohemia, Faculty of Economics	1

Source: author

The Delphi study involved three iterative rounds (see Figure 1), and at each stage the derived group opinion was fed back to the participants. The panel members were requested to re-evaluate their previous replies after the first round in the light of the summary group opinion (strategic vision and mission statement) and to justify other following factors (strategic objectives). While experts were mainly asked for verbal formulation of a strategic vision, a mission statement and strategic objectives in the first round, in the second round, they were asked to revise the vision and mission and to quantify specific objectives for their future measurability. The third round was carried out for final review and revision of the complete set of strategic vision, mission and objectives. All process of the survey lasted from March 2012 to June 2012.

Figure 1 Process of Delphi technique for the Municipality of Strážný



Source: author

A public discussion of the proposals was organized in the Town of Strážný with the participation of various stakeholders after finishing the expert part of the research. Local residents, entrepreneurs and town officials had the opportunity to comment on the proposals.

3 Research results

3.1 Strážný – a town on the Czech-German borders

The Town of Strážný is located near the Czech-German borders in the Region of South Bohemia and it was strongly influenced by the development of the local community and also by the so called Iron Curtain in the past. Historical roots go deeper, Celtic settlements are proofed by the magical stones, which can be found in the surroundings of the town. The town has also a cultural potential. Four cultural sights can be found in this area.

The natural potential around the town is very high and it was influenced by the life in the border area and near the border crossing in a history. The nature is almost intact there, retains its traditional character and that is way the nature represents the most important tourist attractor of the area. The town is located in the area of the National Park and Protected Landscape Area Bohemian Forest.

425 inhabitants live in this small town (2013), but only 2 collective accommodation establishments (i.e. with 10 beds and more) it is possible to find there. The total accommodation capacity is 90 beds and there are 6 restaurants in the town. There is also a small ski centre for downhill skiing located in the area of the town but it is not competitive with the biggest ski centres in the region due to the unmodern infrastructure.

The image and the public perception of the town are strongly influenced by factors connected with negative socio-pathological phenomena such as criminality or prostitution. On the other hand, Strážný is surrounded by unique landscape and nature of the National Park Bohemian Forest. The competitive advantage in terms of Strážný as a potential tourism destination, lies in the strategic position and good accessibility on the main road between South Bohemia and Lower Bavaria, which makes a connection between the important towns of this region - České Budějovice and Passau.

3.2 Delphi as a method for strategic planning of sustainable development in Strážný

The Delphi technique was chosen as a suitable method for strategic planning of sustainable development of tourism in Strážný. The town of Strážný, due to the negative perception and the lack of tourism infrastructure, is not a favourite place for visitors in this time, despite the fact that the history and natural potential of this area (National Park Bohemian Forest) are very high. Due to this fact, and thereby also due to the lack of the data about visitors from the past, the Delphi technique was chosen as a method for forecasting the future of the town as a tourism destination to propose the strategic vision, mission statement and strategic objectives for the planning period 2014 - 2020.

The social factor of sustainable development was also taken into account by strategic planning of tourism development in the Town of Strážný. The positive approach of the residents to the visitors in the town is one of the crucial fac-

tors of sustainable tourism development in this area. The experiences from other towns or villages in the area of the National Park Bohemian Forest were the warning of quick tourism development that does not take into account the needs of the locals. The result can be a high irritation of the local residents to visitors in the area.

This research was exceptional in the Czech Republic. It was demonstrated that the Delphi technique can be used as a method for a strategic planning also for the small towns or villages as a tool of sustainable development of tourism.

3.3 What the Delphi shows

The experts that were involved in the panel should answer the following question in the first round: "*How do you imagine the Town of Strážný for 7-8 years in terms of tourism? Please describe the ideal image of the town in 2020.*" Subsequently, the content analysis and the framework analysis of the answers were carried out. The mission statement was proposed according to the results as follows:

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The first basic question was followed by the additional questions that helped to define the strategic vision for tourism according to the responses of the experts in two versions – the basic vision and the expanded vision. The additional questions were defined as follows:

- *What should the town primarily endeavor to achieve the ideal image? What specific real objectives should be set for the town to 2020*
- *What is needed to do for achieving the objectives according to your opinion? What specific plans / projects / actions for achieving these objectives do you suggest in the next few years (7-8 years) for the development of tourism in the town?*
- *What do you consider as the most important competitive advantage of the town in tourism and how it can be used?*

The strategic vision for tourism was defined as the target state, respectively a shared vision of the experts, how the town should look like in 2020. The strategic vision was proposed according to the results as follows (the basic version):

"The Town of Strážný is a safe place where the prostitution has disappeared from, with a good image for the regional and traditional trade on the border and it is the basis for an active holiday in the summer, winter and off-season."

The expanded strategic vision is more specific and there are also mentioned needs of the most important stakeholders of the town development in tourism – locals, entrepreneurs and visitors. The expanded strategic vision was proposed as follows:

"The Town of Strážný offers a tourism and leisure infrastructure and services in high quality, not only for visitors, but also for the improving a quality of life of the locals. Tourism and leisure services as well as the offer in the case of bad weather are the basement of business activities of the town and create a good image that promotes unity and identity of the local citizens."

After the first round, also the verbal statement of strategic objectives were proposed, but without any quantification. The strategic objectives of the Town of Strážný as a tourism destination were devided into two parts (offer vs. demand) and defined as follows:

The strategic objectives from the tourist offer point of view:

- *To build or to expand tourism superstructure (accommodation + catering facilities)*
- *To build or to expand tourism infrastructure (e.g. hiking and cycling routes, infrastructure for downhill and cross-country skiing, tourist information centre, etc.)*
- *To improve the quality of tourism services*

The strategic objectives from the tourist demand point of view:

- *Increase the number of visitors (one-day-visitors and overnight tourists)*
- *Increase the number of overnight stays*

In the second round, the experts were asked if they agreed with the proposed vision and mission statement of the Town of Strážný. 80% of experts fully agreed with the proposed strategic vision and mission statement, 20% had some recommendations to the proposals, which were taken into account.

The experts should also quantify, specify and revise the strategic objectives in the part of tourist offer and tourism demand while respecting the principles of sustainable development. The strategic objectives were specified and attached to the appropriate priorities of the strategic development (see Table 2).

Table 2 Strategic objectives and priority areas of the tourism development in Strážný

PRIORITY AREA	STRATEGIC OBJECTIVE
1. Tourism superstructure	*To double the accommodation capacity from the current number of beds (90) to 180 beds in a required quality and at least to double the number of overnight stays in Strážný*
	To increase the number of catering facilities about at least 2 new facilities in a required quality
2. Tourism infrastructure	*To build and expand of the tourism infrastructure (downhill skiing centre, sport facilities, cultural facilities, biking and hiking routes, cross-country skiing infrastructure, nature trails) to stimulate a tourism demand*
3. Development of human resources, services and tourism products	*To support a lifelong education of the locals and to develop an active cooperation of the stakeholders in the field of tourism*
	To build a destination management and attractive destination products, including an efficient marketing communication

Source: author

In the third round, the results from the previous phases of the research were finally reviewed and validated by the experts. The basic strategic tools for Strážný as a tourism destination, were defined as a complete set of strategic vision, mission and objectives.

Afterwards, a public discussion of the tourism strategy was organized in the Town of Strážný with the participation of various stakeholders. Local residents, entrepreneurs and town officials had the opportunity to comment on the proposals. Their recommendations and ideas were taken into account. This was the final step, how to bring them together and how to find a consensus among stakeholders with various opinions. It was helpful for discovering the common aims of all participants and the common approach to the tourism development of Strážný was set.

4 Conclusions

The Town of Strážný is not a favourite place for visitors in this time, despite the fact that the historical and natural potential of this area are very high. Due to the lack of the data about visitors from the past, the research was based on the Delphi technique that was chosen as a method for forecasting the future of the town as a tourism destination. The aim of the research was to propose the strategic vision, mission statement and strategic objectives for the planning period 2014 - 2020.

According to the literature review, the Delphi technique has not been used for defining strategic vision, mission and objectives in so many cases in the Czech Republic before. This research creates a methodological framework for application of this method as a tool for strategic planning of tourism development in destinations and brings the opportunity for future research. An application of this method in the small town in the Region of South Bohemia shows that it is possible to find a consensus among various stakeholders in the destination using this technique and to discover the common aims of all participants of the future development of a tourism destination. The future research could be oriented not only to the small destinations on the local level but also on the regional or national level.

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Fairtrade and its Application in the academic Sphere; the Case of the University of South Bohemia, Faculty of Economics

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Abstract: *Fair trade is a concept of social responsibility, which helps more than seven million people in Africa, Asia and Latin America to work and live in decent conditions. The University of South Bohemia, Faculty of Economics, engaged itself in support of the concept in 2010 and gained the status of being a "fairtrade faculty" in 2013.*

This paper is a part of research activities in this field - the main goal is focused on assessing consumers' views on fair trade coffee, and on defining the preliminary input data to be able to profile the typical fair trade coffee consumer at the University of South Bohemia, as one of the long-term fairtrade activities.

Key words: Consumer · Fairtrade · coffee · marketing research · sustainable development

JEL Classification: M31

1 Introduction

Strážný Fairtrade is a sustainable approach to welfare; a counterpart to conventional economics and trade. It is based on some kind of partnership between producers and customers. Producers, involved in the fairtrade system, are able to gain better conditions in negotiation with trade partners and employers, e.g. higher purchase prices, better working environment, education opportunities for them and their children – simply, a better future.

Fairtrade, offers for consumers (customers), an efficient way for how to contribute to poverty reduction and how to be responsible for our planet, as well as the international Fairtrade® trademark guaranteeing them the highest social, economic and environmental standards of consumable products (Fairtrade Labelling Organizations International, 2011).

Thanks to this, Fair trade is the world's best known and most widely used concept of social responsibility. The relationship between business partners is based on mutual communication, respect and transparency, which allow producers to improve their living and working conditions (FLO-CERT, 2011). Therefore, fair trade is mainly associated with the increasing independence of national economies or the continuous growth in exports – a globalization phenomenon of our time.

The cause of globalization is not completely clear. But we can state this; before, more than fifty years ago, after World War II, resources were extremely depleted and the connection between countries and economies had to be, fundamentally, strengthened to ensure, at least, a dignified life for people. Naturally, this process has been led by countries, which were less destroyed by the effects of war (Hoogvelt, 2001).

Trends of globalization were changing over the 21th century, but the original benefits remain – a help. Therefore, fair trade contributes to sustainable development by offering better life conditions to the producers and workers in developing countries (DeCarlo, 2011).

Official fair trade organizations support the social concept by raising awareness between consumers, entrepreneurs and producers to modify the rules of conventional international trade. The idea is to unite small farmers and producers under one umbrella organization (trademark) to gain a better bargaining position in negotiation with large transnational vendors and companies (Hunt, 2013).

All producers and farmers have to be certified by an independent organization FLO-CERT (Fair Trade Labelling Organization), which assists them in the process and helps them to keep international fair trade standards (Nicholls, 2005). The certification, itself, is not the final part of the process – FLO CERT also audits and supervises all members and partners continuously (Oosterveer & Sonnenfeld, 2012). The fair trade philosophy is communicated by Fairtrade® trademark, which provides a guarantee of quality and sustainability for the particular product.

Environmental aspects, certification and social policy initiatives are, of course, important for economic sustainability; however, they are mainly based on current consumption patterns (Peattie, 2010). This concept of "green" consump-

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tion is, therefore, quite natural and has recently emerged as one of the key elements of sustainable development and, also, has been discussed widely in academic debates. In response to that, some schools and universities started to support different social responsibility concepts and tried to change the views of their students to the conventional terms of trade.

2 Methods

This paper reflects the situation of the development of social responsibility in the academic sphere. The Faculty of Economics, (University of South Bohemia) was the first Fairtrade faculty in the Czech Republic, so the main goal of this paper is to assess consumers' views on fair trade coffee after serving it for one day in Café AK (local café for students, employees and public) and to define the preliminary input data to be able to profile the typical fair trade coffee consumer at the University.

Therefore, marketing research, important for planning further fair trade activities at the University, was conducted in June 2014. The research itself was, primarily, focused on opportunities to offer daily some fair trade coffee in the Café AK. The results were evaluated from two points of view – analysis of frequencies yielded results for the primary goal of the research itself and the crosstabs analysis led to the obtaining of basic data about local fair trade coffee consumers.

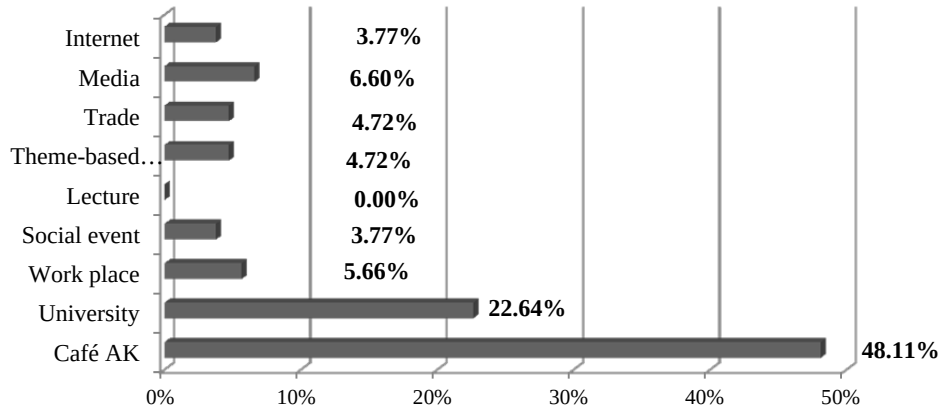
The research was based on quantitative methods, using a questionnaire. The investigation could be characterized as a census procedure, so the sample could be considered as valid and reliable. Anyone, who ordered a coffee (there was just fair trade coffee in the offer for that day) in AK Café, on 2nd June -, was asked to fill in a questionnaire. Respondents answered the questions without the presence of an interviewer. The returnability of questionnaires reached 95%; more precisely 108 of 113 questionnaires were completed. Two questionnaires did not meet the requirements of the research and were excluded. Coding and evaluation was carried out on 106 fully acceptable questionnaires, by using the statistical tool PSPP and the analytical tool Microsoft Excel.

The questionnaire itself contained 4 questions focused on finding out consumers' opinions towards fair trade coffee and 2 questions on socio-demographic characteristics (sex, job). This method, of short questionnaire, was based on the Brand Value Creator method, which is usually used for measuring brand equity, but the concept of a limited amount of accurate questions was suitable, also, for this purpose. Furthermore, thanks to this method, the return-ability was very high. The composition of the sample was based on the inclusion of the usual visitors of Café AK; overall 106 respondents – 60 men and 66 women (74 students, 32 employees).

3 Research results

First of all, we have to evaluate the frequencies of respondents'´ answers. It is important, for this paper, to know if consumers are familiar with the fair trade concept. The first question was, therefore, focused on fair trade knowledge and, especially, on where the respondents gained that knowledge.

Figure 1 Where did you first meet the concept of fair trade? (N = 106)



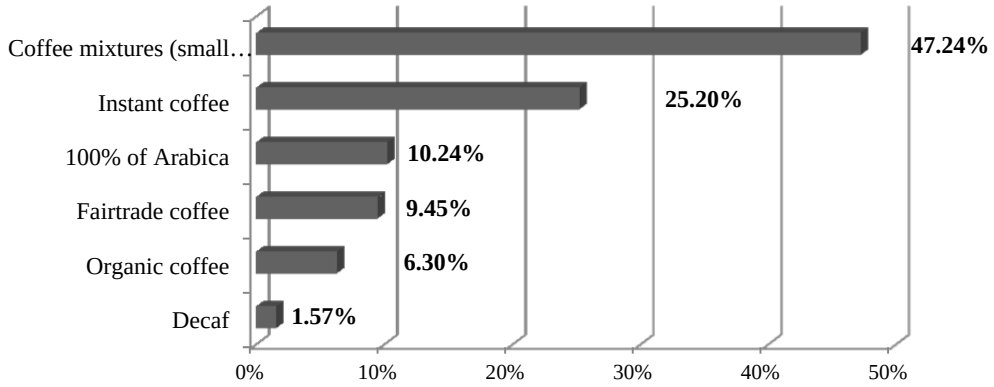
Source: Own processing

The Faculty of Economics is a Fairtrade faculty, but some fair trade activities have been developed, also, by other faculties of the University. This is reflected, also, in the results of the research – all respondents were familiar with the concept and their first encounters with fair trade were realized in connection with their university activities (study, work or free time at the University).

The reason, possibly, could be seen in the increased marketing communication (permanent exhibitions in university buildings, as well as in the Café AK), that raises awareness of fair trade amongst university students and employees.

For the main goal of the research, it was, also, important to gain some general data about the common consumption of coffee. The respondents were asked about their preferences.

Figure 2 What kind of coffee do you prefer? (N = 127, multiple answers)



Source: Own processing

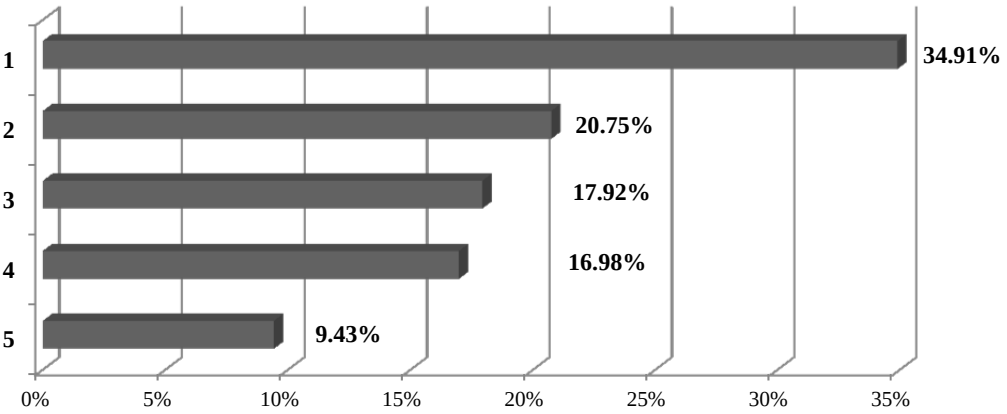
Visitors of Café AK are comfortable, especially with coffee mixtures, which contain a high amount of Robusta coffee beans and a small amount of Arabica coffee beans. These mixtures are slightly less sour than 100% Arabica coffee. The research confirmed, also, the popularity of instant coffee, even though the sales of instant coffee annually are declining. This result could, also, be affected by the popularity of instant coffee within the segment of young people (Retailinfo, 2012) .

Almost 10% of respondents prefer fair trade coffee as a first choice, so that's a good result for the social responsibility concepts.

The following question showed consumers´ satisfaction with the fair trade coffee on offer. This particular coffee was served only for a limited time (a day) with no possibility of substitution for non-fair trade coffee.

The characteristics of the fair trade coffee sample on offer was as follows – Guatemala Duro, 100% of Arabica coffee beans, country of origin Guatemala, roasted in Czech Republic, according to fair trade standards.

Figure 3 State the rating of consumed fair trade coffee? (N = 106, scale 1; lowest rating – 5; highest rating)



Source: Own processing

It is obvious, that this Guatemala Duro fair trade coffee has been received unsuccessfully by consumers. Just less than 10% of respondents considered this coffee as very tasty and awarded it with the highest rating. On the other hand, more than 73% of answers were negative or neutral.

The question is why? What is the cause of consumer's dissatisfaction? We have discussed this using crosstabs analysis. The initial assumption was that the cause of dissatisfaction could be seen in the choice of coffee (100% Arabica). Most of the respondents prefer coffee mixtures (almost 50% of them); therefore, they could consider Arabica coffee as being too sour.

Table 1 Consumers´ satisfaction with Guatemala Duro fair trade coffee according to their preferences

	1	2	3	4	5
Coffee mixtures (small % of Arabica, high % of Robusta)	43%	27%	13%	12%	5%
BIO coffee	13%	25%	63%	0%	0%
Fair trade coffee	8%	8%	17%	42%	25%
Instant coffee	25%	13%	22%	28%	13%
Decaffeinated	100%	0%	0%	0%	0%
100% of Arabica	38%	15%	23%	8%	15%

Source: Own processing

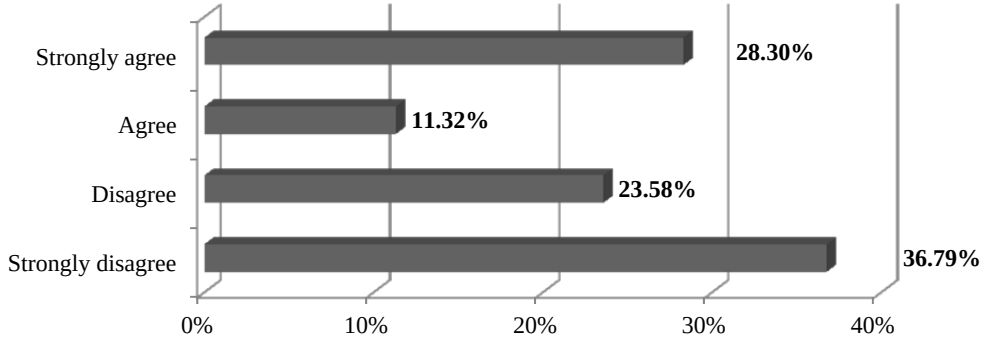
This assumption was partially verified. Almost one half of consumers who prefer coffee mixtures, were disappointed with the fair trade coffee – the high amount of Arabica coffee beans could be seen as one of the causes. Very dissatisfied, were, also, decaffeinated coffee consumers – fair trade coffee is very strong in taste; these two categories are therefore incomparable.

On the contrary, we can see that fair trade coffee consumers are used to the strong taste of coffee. Their evaluation of the Guatemala Duro was the best amongst other categories. Interesting, is, also, the distribution of ratings in the category of pure Arabica consumers. They inclined to be rather negative in their assessment, even though they prefer this sort of coffee.

The explanation could be seen in the different procedures of coffee processing, but verification would have to be supported by further research.

It is not a surprise, thanks to the previous assessment, that most of the respondents didn't agree with the continuation of a daily offer of Guatemala Duro fair trade coffee in Café AK.

Figure 4 Do you agree with the continuous offer of this fair trade coffee in Café AK? (N = 106)



Source: Own processing

However, these results are not completely clear. More than 28% of respondents stated, that they are comfortable with the daily sale of this fair trade coffee and they were strongly in agreement with it. Therefore, it was necessary to assess the results using crosstabs analysis. The results were quite surprising.

We assumed that respondents, with strong preferences towards fair trade coffee, would agree with a daily offering, but we didn´t expect the agreement in the categories of instant coffee and decaffeinated, because their assessment of the coffee sample, itself, was not completely positive (in the case of decaffeinated completely negative). This means, it would be necessary to carry out further research to determine the cause of their agreement.

This marketing research was, especially, important for the management of the AK Café. According to negative responses leading from the research, they decided not to offer this particular fair trade coffee in the café. Thanks to this data, they had quick feedback, which led to the elimination of mistakes in forecasting and the, possible, dissatisfaction of consumers.

Table 2 Agreement of stable offer of fair trade coffee according to respondents´ preference

	Strongly disagree	Disagree	Agree	Strongly agree
Coffee mixtures (small % of Arabica, high % of Robusta)	48%	25%	5%	22%
BIO coffee	13%	50%	13%	25%
Fair trade coffee	17%	8%	17%	58%
Instant coffee	22%	16%	16%	47%
Decaffeinated	50%	0%	0%	50%
100% of Arabica	31%	15%	15%	38%

Source: Own processing

From the point of view of fair trade activity planning, these results led to a little deceleration of fair trade consumption growth – a daily offer of fair-trade coffee would, clearly, strengthen the position of fair-trade at the university, but this data could be used also to assure the success of further attempts at introducing fair-trade coffee; particularly, in helping to choose the best and most preferred type of coffee for consumers to sample.

4 Conclusions

The results of the marketing research have shown that the Guatemala Duro fair trade coffee was not successful among potential consumers in Café AK. However, the research highlighted some interesting information that could be considered as primary input in the process of the profiling of a typical fair trade coffee consumer at the University of South Bohemia.

This data comes from crosstabs analysis, using the socio-demographic characteristics of respondents (sex, job). Results cannot be generalized – they only reflect the local situation.

First of all, we have to conclude, that differences between women and men in fair trade knowledge exists. Men met fair trade for the first time, usually, in Café AK, on the internet or at their work places. Whereas, women, also, participate at social events and theme-based discussions and, also, they know the fair trade concept from the media and their shopping activities.

Men prefer, mostly, coffee mixtures with a high amount of Robusta coffee beans, as well as instant coffee. They do not consume organic coffee or decaffeinated coffee at all; these products are the domain of women's consumption. The slight dominance of women was also observed in the consumption of fair trade coffee; this was confirmed in the assessment of the tested fair trade coffee – 11, 27% of women (5, 71% of men) awarded the Guatemala Duro fair trade coffee with the highest rating.

Despite the higher assessment, neither women nor men agreed with the daily offering of this particular fair trade coffee in Café AK.

According to their job, both students and employees encountered fair trade for the first time, mostly, in Café AK. As expected, students often met the fair-trade concept in their studying process and employees at their workplaces. Employees of the University of South Bohemia gain information, also, from the media or theme-based discussions. Students, on the contrary, learn about fair-trade at social events.

Student respondents prefer instant coffee more than the employees of the University of South Bohemia. On the contrary, employees of the University prefer fair trade coffee more than the students. One interesting finding is, that the students, also, prefer organic coffee and they don´t consume decaffeinated coffee at all.

Overall, the tested fair trade coffee gained a better assessment by employees, despite the fact, that more students awarded the sample with the highest rating. Both categories of respondents, subsequently, decided not to recommend this fair trade coffee to be added into the daily offer at Café AK.

The results of this marketing research were relatively surprising, but very useful for planning the offerings at Café AK and for subsequent fair trade activities at the University of South Bohemia. We gained important information about visitors to Café AK and about their coffee consumption.

The basis for verification of some of the above mentioned assumptions was defined and this basis could serve as a primary input for further research in the field of fair trade coffee at the University of South Bohemia. The continuous research will be focused on gaining data for complex profiling of coffee consumer at the University, including segmentation of groups of consumers according to their socio-demographic characteristic as well as their preferences in coffee consumption. Further research will be rather general than specific – we need to collect basic data of coffee consumption first.

The profile of coffee consumer itself will draw on information obtained through several methods of research – analysis of micro and macro environment, i.e. actual situation at the University including specific behaviour of students and employees during their coffee consumption; research (questionnaire) of actual satisfaction with coffee offer at the University and series of experiments with fair trade coffee.

Experiments were chosen due to the results of this marketing research. It turned out, that the preparatory phase is more important than the launch of fair trade coffee into the sale. Technically, the sale does not imply any problem; however the product selection was inappropriate. For the right choice of fair trade coffee will be better to work with smaller groups of respondents and to put emphasis on understanding not only their tastes, but also other factors, e.g. subconscious influence of marketing communication (Fairtrade mark, fair trade stories), comparison between common and fair trade coffee or influence of different sales techniques.

It is crucial to customize the offer due to the specific characteristic (e.g. smell and taste, story) of fair trade coffee to ensure the success of another sale launch of fair trade coffee. Activities of fair trade at the University are necessary to continuously develop and the fair trade coffee has a great potential to be successful in this environment. The profiling (and segmentation) should serve as one of important tools in a process of wider offering of fair trade (coffee) products at the University of South Bohemia. This marketing research contributes to the process with valuable information, which will serve as a basis for above mentioned further research.

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