AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Andrea ČAPKOVIČOVÁ* and Tomáš HLAVSA**

Approaching the service-based economy: regionally differentiated employment growth in Czechia

The study assesses the employment dynamics of LAU1 regions in Czechia (Czech Republic) in the period 2001-2011 using the territorial approach. It is operationalised on the basis of typological regions. Regions are differentiated firstly by their rurality according to the OECD methodology and the development of non-agricultural employment is used as the second differentiating characteristic. This reflects the regional differentiation based on the character of regional employment development potential. The specifics of rural regions are highlighted. Employment dynamics are assessed in the light of the process of employment restructuring both in its territorial and sectoral characteristics. The results illustrate employment in the service sector to be a viable driver of employment development regardless the degree of rurality but in absolute effects conditioned by its value. Furthermore, employment development is conditioned by the sectoral structure of regional employment. Components of employment development are identified by application of shift-share analysis. The strength of the competitive effect describing the existence of locational advantages for specific sectors is further relativised to calculate its relevance for employment change. In conclusion, the existence of locational advantages has only a minor impact in terms of its relative size on employment change that would normally be expected. Therefore, either more precise regional differentiation is needed or more disaggregated groups of sectors should be used.

Keywords: employment dynamics, rural regions, shift-share analysis

* Univerzita Karlova v Praze, Albertov 6, 128 43 Praha 2, Czech Republic. Corresponding author: capkovia@natur.cuni.cz
** Česká zemědělská univerzita v Praze, Praha, Czech Republic.

Introduction

Rural employment in Czechia (Czech Republic) is losing its traditional backbone in agriculture. The current process of rural restructuring has its origins in the economic transformation that took place after the collapse of communism in the late 1990s (Bičík and Jančák, 2005), a process that was characterised by privatisation and restitution of property. More recently, the globalisation of agricultural and food markets, and technological change have also had significant impacts on employment (Porter et al., 2004; Woods, 2005; OECD, 2006).

This paper describes the characteristics of further differentiation of employment development among categories of LAU1 regions differentiated according to their degree of rurality. The study uses a territorial approach to cover issues of employment restructuring. Territoriality is captured not in space but via the categories of regions (rural, intermediate, suburban and urban). Firstly, we shed some light on the employment dynamics by superimposing differentiating characteristics on the regional degree of rurality, and further differentiate rural regions according to the level of development of non-agricultural employment while referring to their development performance. As the period of interest we choose the last two censuses (2001 and 2011). Secondly, we look at the components that affected the identified shifts in the employment structure. For this step we utilise the shift-share model in its classical form. By doing so, we are able to decompose the employment shift into three components: the national growth effect, the industry mix effect and the competitive effect.

The idea to map regional employment development originates from emerging processes that affect (hamper or improve) this development, either in social and/or economic terms. The drivers of change result in qualitatively and quantitatively different outcomes, mainly due to the regionally differentiated resource base, social and human capital endowments and economic evolutionary paths. Furthermore, differentiated dynamics among regions may also be related to the degree of flows of capital and transfers of knowledge and technologies. It is also important to consider regionally-based socio-economic and demographic structures (Abrhám, 2011).

Rural restructuring process or the story of the changing rural economy base

The weakened position of the agricultural sector as an economic driver and provider of employment has been the subject of much debate. Marsden (1995) specifically stresses the redefined role of agriculture both in social and economic life in rural areas as originated in the 1980s. The transition from productivism into post-productivism (Wilson, 2001) is considered to be one of the key factors of this. The transition resulted in a weakening of the ties between farmers and other rural dwellers, accompanied by globalisation and technological change that led to a decline in the demand for agricultural labour (Sotte, 2005; OECD, 2006). Moreover, a more consumption-based economy has evolved (Woods, 2005). Additionally, the rural space is being commercialised (Post and Terluin, 1997) as a result of (re)invention of new functions of rural space. In Czechia the concept of second homes (Fialová and Vágner, 2014) and farmers' markets (Spilková and Perlín, 2013; Spilková *et al*., 2013) are examples of how the 'brand' of rural can be commercialised.

The rural economy of the last few decades needs to be connected with the decline in agricultural employment and the increase in non-agricultural activities. Breitenfellner and Hildenbrandt (2006) used the term *tertiarisation* to refer to the rise of the tertiary sector. They point out that the countries that joined the European Union (EU) in 2004 are characterised by a process of catching-up of tertiarisation that is influenced by specific time-lag conditions for the development of service employment, mainly related to the legacy

 OPEN ACCESS PEER REVIEWED

of the centrally planned economy where manufacturing was strongly supported.

While the local economic conditions are the outcome of both local and non-local processes (Ward, 2006), we may anticipate a differentiation of this tertiarisation process not only from a macro perspective by comparing western and eastern Europe, but even more in regional terms at national level. The development may be differentiated in relation to proximity to economic centres as well as the performance of adjacent areas. We should also be aware of the fact that the economic composition of countries and regions results from an evolutionary process (Porter *et al*., 2004), when its path, speed and magnitude within boundaries of individual geographical units will depend both on inherited conditions that are local (location, resource base) and external (Porter *et al*., 2004). Lowering the macro into categorised micro perspective allows us to observe global processes with better understanding.

Regionally differentiated employment growth conditionalities

Regional disparities in economic (and related employment) growth generate both great interest as well as controversy among policy makers and planners. As Mitchell *et al*. (2005) rightly paraphrased the Keynesian macroeconomists, most differences in the sensitivity of regions to the business cycles (and therefore the existence of regional disparities in economic growth) are attributable to variations in the industry mix within each region. The understanding of the existing disparities, originated from the variations in the mix of industries, may be improved by the knowledge of the regional sectoral structures. It is related to the character of interrelations among sectors (e.g. the concept of clusters developed by Porter, 1998), the presence of diversified or specialised economic structure (e.g. Trendle, 1999, 2006; Mason, 2009; Mason and Howard, 2010; Nissan and Carter, 2010) or the existence of locational advantages (enhanced via agglomeration effects and externalities described by Marshall and Jacobs) (cited by Blažek and Uhlíř, 2011).

We proceed by identifying the main trends in employment growth in categories of regions of different degrees of rurality, using the aggregated groups of sectors (agriculture, industry and services) at the level of Czechia. The reasons for the use of aggregated groups are (a) that we can easily derive information on recent processes of interest – deagriculturalisation, deindustrialisation and tertiarisation; and (b) the focus is on the regional differentiation of above-mentioned processes, not to analyse detailed sectoral restructuring. Consequently, we look at differentiated categories of rural regions on the basis of non-agricultural employment development as it describes how well the regions cope with conditions for market-based sectors that are not dependent on natural resources. In order to be able to divide the growth into particular components, we adopt the shift-share analysis in its classical form in the further step.

Figure 1: LAU1 regions of Czechia in 2011 according to the OECD typology of rurality (IN: intermediate; PR: predominantly rural; PU: predominantly urban).
Data source: CzSO (2012)

Methodology

Regional differentiation of rurality and non-agricultural employment

Analyses are made at the level of LAU1 regions (*okresy* in Czech) because of (a) their representative size with respect to the areas of regional labour markets (OECD, 1996) and (b) the data availability over the indicated time period (2001-2011). The regions were categorised according to the OECD typology (OECD, 2010) of predominantly rural (PR), intermediate (IN) and predominantly urban (PU) (Figure 1). Adoption of a lower population density threshold (e.g. 100 inh/km^2) would be counterproductive: according to his findings based on smaller settlement units (*obce s rozšířenou působností* or 'municipality with extended powers'), Perlín (2010) observes (p.193) that "under the conditions of the Czech settlement system, this value [150 inh/km^2] will enable a much more varied assessment of rural areas".

By applying the methodology proposed by Esposti *et al*. (2000), the LAU1 regions are further categorised into 'leading', 'average' and 'lagging' according to their non-agricultural employment development within the chosen time period. Leading regions record rates of non-agricultural employment development that are above the national growth rate by at least some percentage points (subject to choice). Similarly, lagging regions have rates of non-agricultural employment development that are lower than the national growth rate by at least some percentage points. Those regions with non-agricultural employment development between these two points are considered to have an average growth rate. In the example of Czech LAU1 regions, the categories are constructed by considering the decile distribution of non-agricultural employment development. By studying the development of non-agricultural employment, we are better able to understand the employment change in respective regions because, in the longer term, these sectors are expected to be the biggest providers of employment, especially in the rural regions most affected by agricultural labour decline.

As the reference time period we choose the years of last two censuses (2001 and 2011). This period includes the lead-up to Czechia's accession to the European Union (EU) and

more than half a decade of EU membership (2004-2011). The main data sources used for the analyses are provided by the Czech Statistical Office (CzSO). The division of LAU1 regions according to OECD categories are made on the basis of CzSO (2012) which provides the latest available data (from 2011). The regional data on employment are derived from the databases of the two censuses and the sectors of employment are gathered into three aggregated groups according to NACE Rev. 2 – agriculture (A), industry (B-F) and services (G-U).

Shift-share analysis

Shift-share analysis is a popular tool for describing regional and industrial growth over a particular time period (Herath *et al*., 2011). In the field of regional studies, employment data are most commonly used for the calculation of the components of the shift-share analysis (e.g. Ray and Harvey, 1995; Mayor and López Menéndez, 2005; Bielik and Rajčániová, 2008; Klein *et al*., 2009; Herath *et al*., 2011; Kowalewski, 2011).

The *shift* component refers to whether the local economy moved into faster (dynamic) or slower growth sectors. The *share* component then measures whether the larger or smaller share of growth occurs in a given sector in a given region (Kiser, 1992). As we refer to sectors in both definitions, the essence of the shift-share methods is in the breakdown of employment changes into instructive components describing the conditions under which growth is occurring (Ray and Harvey, 1995). The results of the shift-share analysis need to be interpreted and understood as signals only; they do not give any information on the ability of the region to maintain the dynamic (growing) sectors (Potomová and Letková, 2011). Also, the results cannot identify any locational advantages even if they signal some (Klein *et al*., 2009). The real *forte* of shift-share analysis is the discovery of employment change patterns across geographical areas (Ray and Harvey, 1995).

Based on the classical version of the model presented by Esteban-Marquillas (1972), the technique of shift-share analysis allows that "for a given period of time the regional growth of each sector can be divided into three components: national growth (g_{ij})[1], industry mix (k_{ij})[2] and competitive effect (c_{ij})[3]" (p.249). Therefore, the model will be constructed as follows:

$$d_{ij} = g_{ij} + k_{ij} + c_{ij} \quad (1)$$

where

$$g_{ij} = b_{ij} r_{CZ} \quad (2)$$

$$k_{ij} = b_{ij} r_{iCZ} - b_{ij} r_{CZ} = b_{ij}(r_{iCZ} - r_{CZ}) \quad (3)$$

$$c_{ij} = b_{ij} r_{ij} - b_{ij} r_{iCZ} = b_{ij}(r_{ij} - r_{iCZ}) \quad (4)$$

where b_{ij} = employment in sector i of region j, r_{cz} = national average rate of growth (in our case we use *CZ* as the abbreviation for Czechia), r_{iCZ} = national average rate of growth of sector i, and r_{ij} = growth rate of sector i of region j.

Therefore, by incorporating equations (2) - (4) into equation (1) we get:

$$d_{ij} = b_{ij} r_{CZ} + b_{ij}(r_{iCZ} - r_{CZ}) + b_{ij}(r_{ij} - r_{iCZ}) \quad (5)$$

The first two components are determined exogeneously while the third is the only endogeneous component in the model (Herath *et al*., 2011). Therefore the interpretations of national growth effect and industry mix effect are related to the rate of growth of the national economy and respective sectors irrespective of any regional changes. On the contrary, the competitive effect is endogeneously driven by considering the regional growth performance.

The value of the competitive effect component carries some other valuable information. For example, its positive value implies that the regional economy has been successful at attracting investment to a particular sector (Herath *et al*., 2011) that resulted in the better conditions for growth of a specific sector in a region. In other words it can also be interpreted as the comparative advantage for a region in a particular sector in relation to other regions. Moreover, combined with the positive industrial mix effect it shows the potential for a competitive advantage in that sector (Herath *et al*., 2011), derived on the local endowments as well as other factors of competitiveness localised in the region – e.g. strategy and structure of regional businesses and the intensity of local competitiveness, factors on the supply side (market size, market characteristics) and the existence of production clusters of relatively closed production chains (existence of follow-up and intertied industries) (Blažek and Uhlíř, 2011).

The classical shift-share analysis has been subject to many modifications. Esteban-Marquillas (1972) reacted to Rosenfeld´s critique on the classical shift-share model as follows: "Rosenfeld argues that the values that c_{ij} can take (4) are not only due to the special dynamism of the sector ($r_{ij} - r_{iCZ}$), but also to the specialisation of the regional employment in this activity, b_{ij}" (p.250). Therefore, he introduced the new element b'_{ij}, called *homothetic employment*, defined as the employment that sector i in region j would have if the structure of employment in that region was equal to the national structure. We incorporate homothetic employment as a way of deepening our present study.

[1] *National growth effect* (g_{ij}) describes the employment change that would have occurred if the region had grown at the same rate as the reference area. Moreover, as the region is a part of the reference area, it is assumed that any positive/negative employment change at the reference area will be mirrored by rising/declining change in regional employment (Klein *et al*., 2009).

[2] *Industry mix effect* (k_{ij}) measures the employment change that would have been experienced by the region if each of its industrial sectors had grown at the national rates for these sectors less the national growth effect (Herath *et al*., 2011). Moreover, it helps to identify fast/slow growing sectors or industries. In other words, it highlights those sectors that "have been playing a major role in employment growth" (Herath *et al*., 2011, p.162), both in positive and negative terms. A positive industry mix effect implies the existence of favourable distribution of fast growing industries in the region (Ray and Harvey, 1995).

[3] *Competitive effect* (c_{ij}) measures the regional employment change in an industry conditioned by regional factors (Klein *et al*., 2009). It is calculated as the difference between the actual change in employment of sector i in region j and the employment change that would have occurred if each industrial sector i in region j had grown at the national level (Herath *et al*., 2011). It collects the special dynamism of a sector i in region j by contrasting it with the dynamism of the same sector at the national level (Mayor and López Menéndez, 2005).

Results

Regional differentiation of employment development

The lagging regions are located by national and inner regional borders (Figure 2). The concentration of leading regions is most evident adjacent to Praha (PHA), particularly on the development axis from Plzeň (PM) to Mladá Boleslav (MB). Other leading regions are located around Brno (BM), the centre of Moravia. The category of average regions is more numerous by the southern national border and adjacent to the previously mentioned development axis.

Table 1 gives more details about the LAU1 regions according to their degree of rurality and non-agricultural employment development performance. It highlights their distribution among all regions as well as the respective population and area share. The most positive developments were recorded in two regions around Praha (PZ and PY). The data reveal their dominance in this development pattern within the group of leading regions (PU and IN). Therefore, they represent an additional category to the three OECD categories as they are subtracted from these and designated as suburban (SUB) regions.

The development of non-agricultural employment in Czechia from 2001 to 2011 was negative (-2.3 per cent). This number is connected with overall decline of employment (-3.9 per cent) (Table 2). Moreover, within the time period 2001-2011 there was the period of economic crisis (starting from 2008) that inevitably affected both the business climate as well as the investment environment. However, the employment dynamics among the categories of regions seem to be rather differentiated. The decline in overall employment was highest in the PR regions, in contrast to a substantial increase in SUB regions. Agricultural employment declined and service employment increased in all categories of regions but to differing extents.

The most positive changes in employment were observed in leading IN, followed by leading PU and leading PR LAU1 regions (Figure 3). The means for all three categories the percentage increase in employment exceeded the national

Table 1: Number of Czech LAU1 regions and their area and population share according to OECD typology and level of non-agricultural employment development, 2011.

Category	Number	Area share %	Population share %
Predominantly rural	21	34.8	16.8
leading	4	6.3	3.2
average	6	9.3	6.0
lagging	11	19.3	7.6
Intermediate	47	60.2	55.5
leading	15	19.4	19.1
average	8	10.8	9.5
lagging	24	30.0	27.0
*Predominantly urban**	7	3.2	25.1
leading	2	0.9	15.4
average	1	0.3	1.8
lagging	4	2.0	7.9
Suburban	2	1.7	2.6

*including Praha
Data source: CzSO (2012)

Figure 2: LAU1 regions of Czechia according to their level of non-agricultural employment development during the period 2001-2011.
Data sources: Czech Statistical Office (CzSO) censuses of 2001 and 2011

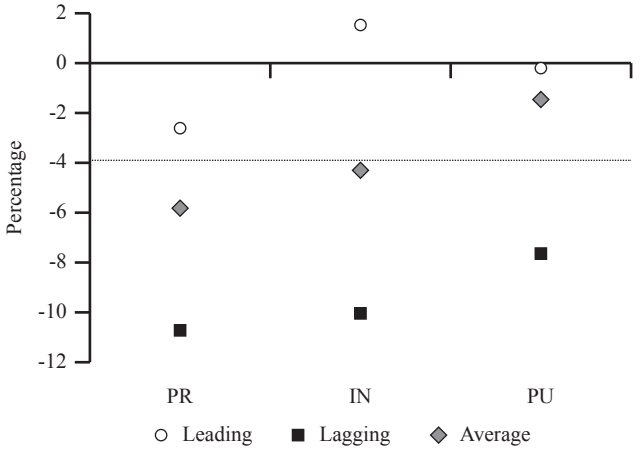

Figure 3: Employment growth in Czech LAU1 regions according to their level of non-agricultural employment development.
The dotted line indicates the change in total employment across Czechia
Data sources: CzSO censuses of 2001 and 2011

Table 2: Employment profile and change (per cent) in employment between 2001 and 2011 by aggregated groups of sectors in Czech LAU1 regions according to OECD typology.

OECD category	Agriculture			Industry			Services			Total change
	2001	2011	change	2001	2011	change	2001	2011	change	
PR	9.4	6.3	-38.4	43.9	41.3	-13.1	46.7	52.5	4.0	-7.5
IN	5.0	3.3	-37.6	44.3	40.9	-12.5	50.6	55.8	4.4	-5.2
PU	0.9	0.6	-28.0	29.7	25.5	-16.5	69.4	73.9	3.9	-2.5
SUB*	3.6	1.8	-28.1	33.8	25.7	9.6	62.5	72.5	67.5	44.5
All regions	4.7	3.0	-37.3	40.3	36.5	-13.0	55.0	60.4	5.6	-3.9

*SUB is subtracted from respective IN and PU category
Data sources: CzSO censuses of 2001 and 2011

average. By contrast, the lagging PR regions performed the most poorly. In this case, the low population density only supports the negative cumulative effect – the higher the degree of rurality, the more lagging performance in terms of employment development.

In all categories of LAU1 regions any positive changes in employment are related to the service sector (Figure 4). A slight decline occurred in employment in industry and overall performance was hindered by the decline of employment in agriculture. This supports the evidence presented by Breitenfellner and Hildebrandt (2006) on the catching-up of tertiarisation. Interestingly, the three categories of PR regions achieved the highest increases in service employment in comparison with the other OECD categories in the respective sub-groups. However, this created potential was more than offset by the declines in employment in agriculture and industry.

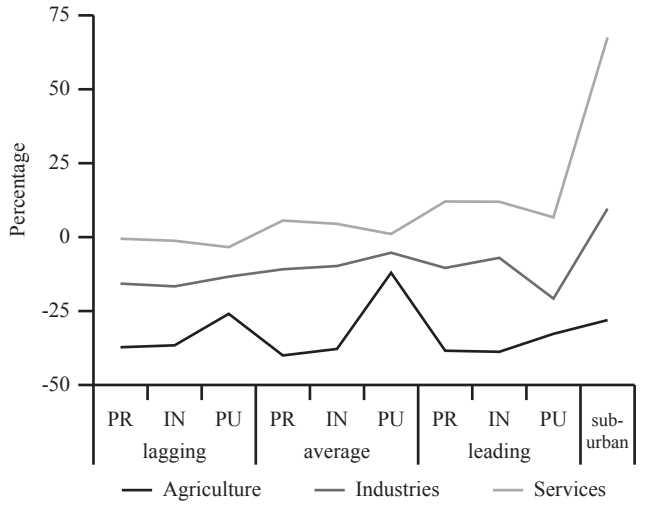

Figure 4: Rate of change in employment by aggregated groups of sectors in Czech LAU1 regions between 2001 and 2011 according to OECD typology and their level of non-agricultural employment development.

Data sources: CzSO censuses of 2001 and 2011

Regionally based employment growth components

The components of regional employment changes by sector according to OECD categories of LAU1 regions are presented in Table 3. By decomposing these changes into particular components while adopting the shift-share model in its classical form, the national growth component is seen to be negative in all cases (both total values and values for the aggregated groups of sectors). This indicates that this much employment would have been lost if the regional employment (overall and in aggregated groups of sectors) had followed the overall/national trend, i.e. a decline of 3.9 per cent. The values differ with respect to the size of the regions, and therefore the size of the regional labour market. Where it is relevant, the national growth effect is related to actual growth by stressing its role in employment decline.

Several points may be stressed. The negative value of the *national growth component* in agriculture is smaller than for the other two groups of sectors, indicating their minor role in the employment change. The pressure of the national growth effect on the employment performance in regions and aggregated groups of sectors was scaled by the size of the regional labour markets. The effect of agriculture on employment change is small in absolute terms, and this is mainly due to its regional size scaling as well as the reorientation of the economy from traditional industries towards service employment.

The *industry mix component* is used to indicate the presence of fast/slow growing industries in regions relative to the national average. The results of this component in terms of the OECD categories of regions highlight two findings. Firstly, in all categories the aggregated group of services has the highest absolute numbers. Secondly, for PR regions and IN regions, the total employment change attributed to the component of industry mix is negative. This is due to their unfavourable structure of sectors (Table 2). The performance of fast-growing service groups was negatively outperformed by those of the agriculture and industry sectors that are of

Table 3: Components of employment shift in aggregated groups of sectors in the period 2001-2011 in Czech LAU1 regions according to OECD typology (persons employed).

OECD category	Aggregated sectoral groups	National growth effect	(%)*	Industry mix effect	Competitive effect	Actual growth
PR	Agriculture	-2949	10.1	-25247	-881	-29077
	Industry	-13756	29.8	-32016	-349	-46121
	Services	-14634		35572	-6081	14858
	Total	-31339	51.9	-21691	-7310	-60340
IN	Agriculture	-5167	10.4	-44237	-418	-49822
	Industry	-45684	31.2	-106325	5770	-146239
	Services	-52162		126797	-16086	58549
	Total	-103013	74.9	-23765	-10733	-137512
PU	Agriculture	-415	13.9	-3555	983	-2987
	Industry	-14181	23.7	-33005	-12695	-59882
	Services	-33093		80444	-14694	32657
	Total	-47690	157.9	43884	-26407	-30212
SUB	Agriculture	-134	13.9	-1145	316	-963
	Industry	-1254		-2920	7274	3100
	Services	-2319		5636	36861	40178
	Total	-3707		1571	44451	42315

* Percentages only shown where actual growth was negative

Data sources: CzSO censuses of 2001 and 2011

higher absolute size in the regional employment structure. In contrast, PU and SUB regions benefit from higher shares of service employment.

The remaining component of the shift-share decomposition – *the competitive effect* – is used to measure the regional employment change in an industry conditioned by regional factors, and so to indicate the existence of locational advantages for the specific sectors in the region. The most remarkable results related to this component are the following. Firstly, PR regions were not able to offer any locational advantages in any of the three aggregated groups of sectors that would nurture the environment for further employment development. Secondly, IN regions created the conditions for the development of employment in industry that might have been attributed to the increase of 5,770. Thirdly, surprisingly, the category of PU regions recorded positive values for competitive effect in agriculture that would indicate existing locational advantages. This is in conflict with the overall decline in agricultural employment (Table 2). What the competitive effect identified is the rate of growth of employment in agriculture that is regionally higher than in Czechia as a whole. In a very cautious manner we may interpret this finding by stressing the sensitivity of the sector to the global and structural changes. What affects the rate of employment change in agriculture (Table 2) in PR and PU regions is not just the absolute numbers of persons employed in agriculture that are used for the calculation, but more importantly the description of those that are employed in agriculture and report their place of residence either in PR and PU regions. In PR regions, these are traditionally farmers and agricultural workers. On the other hand, those residents from PU regions reported as employed in agriculture are rather business managers and land owners. The fluctuation of employment within these two categories is then self-evident. Finally, only SUB regions gained with respect to regional conditions and the positive employment development in all three aggregated groups of sectors.

Shift-share analysis at the level of LAU1 rural regions and aggregated groups of sectors

Here we look at the components of employment change for individual rural LAU1 regions. Firstly, in agriculture the national growth component is negative in all cases (Figure 5) but we again should refer to the absolute size of the effect conditioned by the size of the regions. The industry growth component in relation to agriculture is also negative. This result is evident also from Table 2, where the decline in agriculture is the highest. The share of the sector in the employment structure only enhanced the magnitude of the negative consequences for regional employment. The competitive effect differs between regions, with just five positive values, and even these are not big enough to contribute positively to the employment growth in the aggregated group of agriculture. In summary, the employment growth effect in agriculture is of minor importance for the overall employment shift – the size of the effects is both conditioned on the regional size as well as on the share of the agriculture in regional employment. Therefore, although negative numbers recorded in this category do play a role in employment

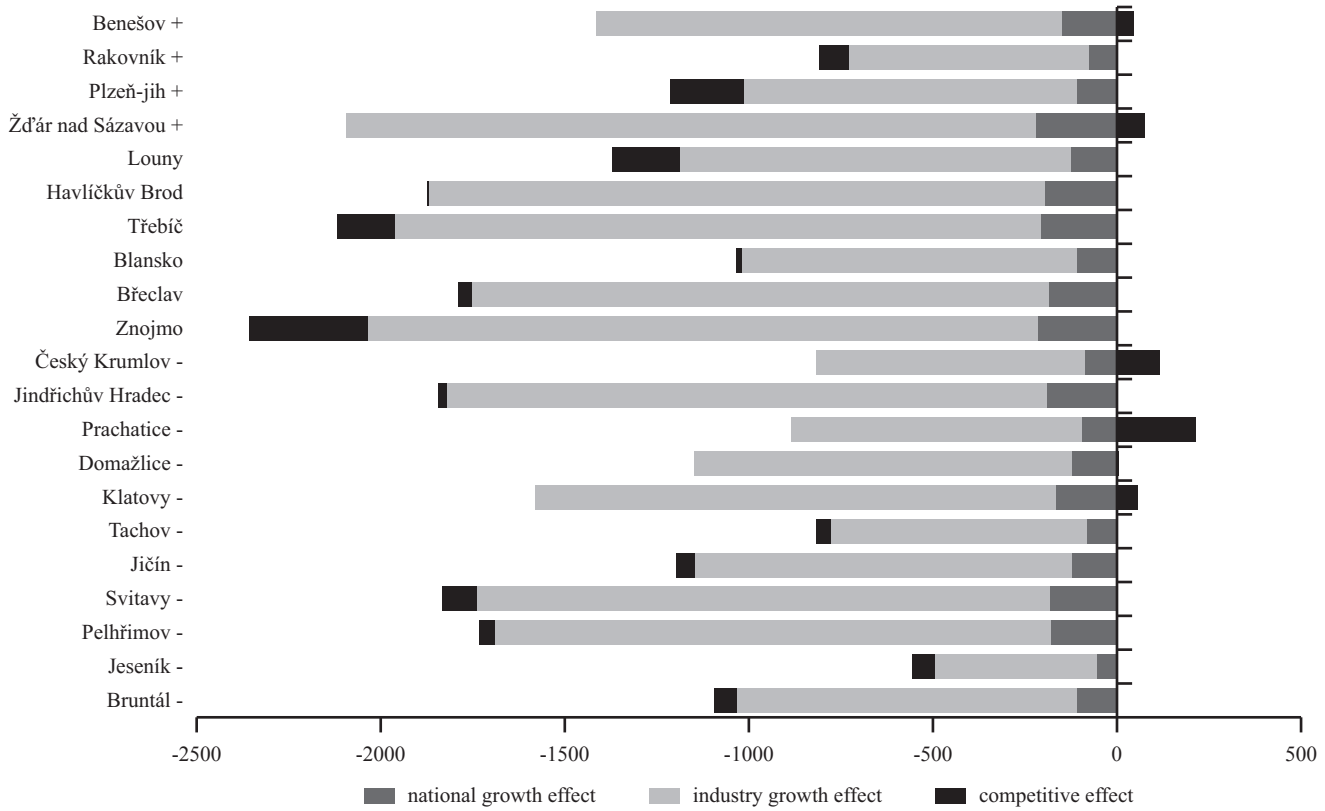

Figure 5: Employment shift in the aggregated group of agriculture in PR Czech LAU1 regions, components of shift-share analysis of 2001-2011.

Note: - refers to lagging region, + refers to leading region, the others are average regions
Data sources: CzSO censuses of 2001 and 2011

decline, it is of lesser importance than in the remaining two aggregated groups.

Secondly, we look at the components of employment change in the aggregated group of industry (Figure 6). This group has a higher share of regional employment, therefore, also the size of three components of employment change will be higher than for agriculture. The national growth component is again negative in all cases. Combined with the negative values of industry mix effect, these two factors are playing the major role in the employment decline as regards the aggregated group of industry. Although the competitive effect is strong in some examples (e.g. Plzeň-jih, Louny, Žďár nad Sázavou and Břeclav), it is outperformed by the negative change of those two components. Moreover, the differentiation of the competitive growth effect in the aggregated group of industry at LAU1 region level divides the respective rural regions into those that were successful in attracting industrial investment (positive competitive effect) and those that were not (negative competitive effect).

Thirdly, attention is paid to the aggregated group of services (Figure 7). This group is the most influential in relation to the number of jobs that are affected by the changes that have occurred. The national growth effect is negative in this aggregated group. This result is not surprising, because the component reflects the changes that would have been occurred with respect to the employment in a respective group if it had followed the overall (national) employment development, and in the period 2001-2011 this was negative. However, the industry mix effect is of higher (in the meaning of being positive) importance than it was in the case of the aggregated groups of agriculture and industry. Therefore, the aggregated group of services can be considered to be truly the driver of positive employment change – the most vital employment provider and creator. The term 'positive' refers rather to its possibility to generate employment than any effect that would be able to sustain overall positive employment development because it is also influenced by effects of employment shift in other aggregated groups as their share in regional employment structure is significant.

According to Herath *et al*. (2011), the combination of positive industrial mix effect and the positive competitive effect implies the prerequisite for the competitive advantage in the respective sector. We may find examples of this in the rural LAU1 regions of Žďár nad Sázavou, Plzeň-jih, Rakovník, Benešov, Znojmo and Blansko. With the exceptions of Znojmo and Blansko, the named regions belong to the classified leading category. Therefore, the overall performance in these regions is unarguably influenced by the presence of positive industrial mix as well as the locational advantages they can offer to service sectors. On the other hand, the other regions lack the dynamism of the employment growth in this aggregated group. The possible reasons may be the incorrect or inadequate utilisation of the development factors (e.g. infrastructure) or an even more recently pronounced development pre-requisite – the institutional environment and its capacity. In both cases (industry and services), the presence of positive competitive effects in some regions deserves further investigation that is beyond the scope of this paper.

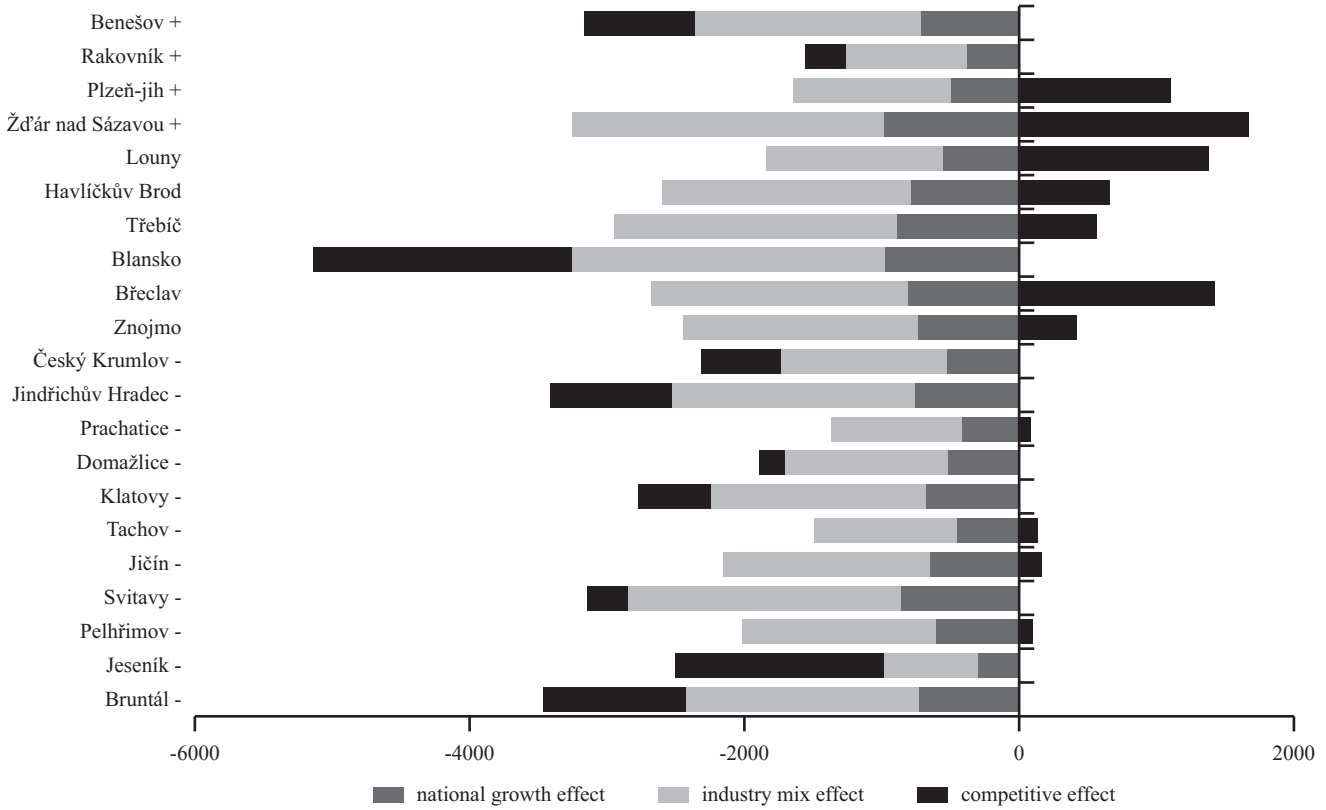

Figure 6: Employment shift in the aggregated group of industry in PR Czech LAU1 regions, components of shift-share analysis of 2001-2011.

Note: - refers to lagging region, + refers to leading region, the others are average regions
Data sources: CzSO censuses of 2001 and 2011

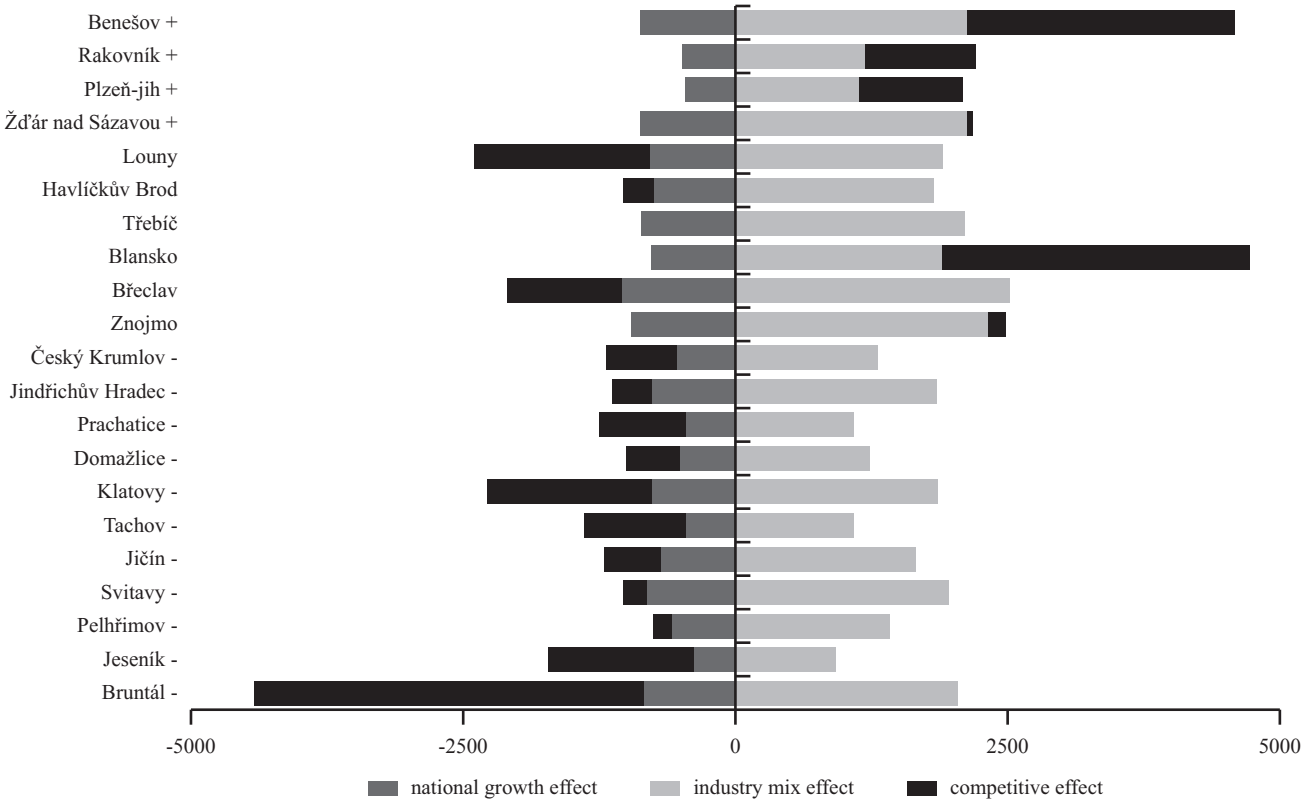

Figure 7: Employment shift in the aggregated group of services in PR Czech LAU1 regions, components of shift-share analysis of 2001-2011.

Note: - refers to lagging region, + refers to leading region, the others are average regions
Data sources: CzSO censuses of 2001 and 2011

Influence of competitive effect shift on total shift

So far we have described the components of employment growth in absolute terms. As previously mentioned, the size of these effects is conditioned on the absolute size of the regional labour market. Therefore, for analytical reasons we calculate the relative competitive effect[4]. Its value may be interpreted as the potential for regional employment shifts to influence the total shift in respective aggregated groups of sectors and irrespective the size of the region.

Quite favourable conditions present locally are in leading and average rural regions when these generate employment thanks to the locational advantages in two aggregated groups – industry and services. On the contrary, the lagging rural regions seemed to be the ones suffering from the lack of locational advantages for more progressive sectors besides the traditional – agricultural – one. Even if the presence of locational advantages is quite clear in the examples presented in Table 4, this fact does not directly imply that it would be the fruitful generator of employment. Therefore, not only is their presence crucial but more importantly the contribution they make to the employment shift. The relative values of the competitive effect are rather small: they vary from 0.02 per cent (aggregated groups of services in average rural regions) to 3.01 per cent (aggregated groups of services in leading rural regions).

[4] Calculated as the absolute size of the competitive effect compared to absolute employment at the beginning of the period. The percentage deviation of the competitive effect results (Klein *et al*., 2009).

Table 4: Competitive effect share of employment shift in the aggregated groups of sectors in Czech LAU1 rural regions, 2001-2011 (absolute and relative shift).

	Category:	Leading	Average	Lagging
Agriculture	Absolute	-163.28	-726.05	8.54
	Relative (%)	-0.11	-0.26	0.00
Industry	Absolute	1675.10	2549.69	-4573.81
	Relative (%)	1.12	0.91	-1.22
Services	Absolute	4491.13	43.62	-10615.36
	Relative (%)	3.01	0.02	-2.84

Data sources: CzSO censuses of 2001 and 2011

Discussion

In Czechia, at national level there has been an increase in service employment that corresponds with global changes. At the same time, mechanisation and improved production operations have led to declines in both agricultural and industrial employment. While referring to the aggregate group of industry, we may also point out that not only technological improvements but more importantly the global production markets (and related global production networks) have conditioned the changes in employment.

Furthermore, the magnitude of these changes is further conditioned by the regional degree of rurality. Because we operate at the level of aggregated group of services, we cannot fully assess the quality of this change in terms of the level of knowledge utilisation. With regard to the PR regions, their performance of service employment exceeded their IN and PU counterparts in all non-agricul-

tural employment development groups. This highlights the evidence on (re)invention of rural functions other than production that demand labour (e.g. recreation and tourism). Furthermore, the differentiation of PR regions in terms of non-agricultural employment development shows the heterogeneity that exists among them as was noted in the employment growth components of the respective sectors. It is attributable to their location – mainly in those areas adjacent to the capital that offer many development opportunities as characterised by the presence of infrastructure, business networks etc.

The decomposition of employment growth using shift-share analysis further supports the role of the service sector as the viable employment provider when the major increase is recorded due to their positive industry mix effect. In PR regions the positive value of the competitive effect in service employment is outperformed by the two other aggregated groups. The inner differentiation of components between lagging and leading categories reveals the presence of positive cumulating effects in the leading category in contrast to the lagging one. Furthermore, the non-agricultural employment development used as the differentiation characteristic is considered to differentiate the overall development in more complex way. What needs to be taken into account is the location itself, the existence of economic spillovers, as well as the path dependency. Referring to the latter, the utilisation of locational advantages needs to be considered from the external perspective but, most importantly, the inner conditionalities are those that operate as the base allowing/hindering the development strategies. These can be described as the quality of institutional environment, industrial tradition, image of the local economy, quality of human capital etc.

The SUB regions recorded the highest increases of service employment in the period of observation and we expect this trend to continue. Therefore, rural regions in general (and not only these) will be further threatened by the existence and the power of these strong development centres and their spread effects in adjacent areas. However, following the trend of rural commodification and the related change in lifestyles, rural areas will even more be considered to be the source of goods and services demanded by (mostly urban) customers (e.g. in the form of second homes or farmers' markets). Therefore, the potential of rural employment development is inevitably in the service provision of recreation, tourism, adventure and other place-specific activities, as well as partially in non-mass agricultural production. What remains as a threat in future is their dependency on externally defined needs related to the traditional attributes of rural areas. The extent to which rural employment would copy and adjust to urban-based tastes limits the potential for growth and challenges the qualitative change of rural labour markets (education, skills).

Surprisingly, the relativised strength of the competitive effect on overall employment change is rather small. Therefore, for further research it is advisable to reconsider the research design. The focus should be on the construction of precise regional categories as well as the possibility to incorporate further disaggregated groups of sectors.

Acknowledgement

This study was supported by the research project of Charles University Grant Agency (GAUK) no. 1310514 and the Internal Research Grant (IVP) no. 1285 provided by the Institute of Agricultural Economics and Information, Praha.

References

Abrhám, J. (2011): Rural development and regional disparities of the new EU Member States. Agricultural Economics – Czech **57** (6), 288-296.

Bičík, I. and Jančák, V. (2005): Transformační procesy v českém zemědělství po roce 1990 [The transformation processes in Czech agriculture after 1990]. Praha: Univerzita Karlova.

Bielik, P. and Rajčániová, M. (2008): Shift-share analysis of employment growth – the case of the V4 countries. Agricultural Economics – Czech **54** (8), 347-351.

Blažek, J. and Uhlíř, D. (2011): Teorie regionálního rozvoje [Regional development theories]. Praha: Karolinum.

Breitenfellner, A. and Hildebrandt, A. (2006): High Employment with Low Productivity? The Service Sector as a Determinant of Economic Development. Monetary Policy & the Economy **1**, 110-135.

Esposti, R., Godeshalk, F.E., Kuhmonen, T., Post, J.H., Sotte, F. and Terluin, I.J. (2000): Statistical Analysis of Employment Growth in Rural Regions of the EU, 1980-1995, in Terluin, I.J. and Post, J.H. (eds), Employment Dynamics in Rural Europe. Wallingford, UK: CAB International, 39-58. http://dx.doi.org/10.1079/9780851994994.0039

Esteban-Marquillas, J.M. (1972): Shift- and Share Analysis Revisited. Regional and Urban Economics **2**, 249-261. http://dx.doi.org/10.1016/0034-3331(72)90033-4

Fialová, D. and Vágner, J. (2014): The owners of second homes of rural space in Czechia. Acta Universitatis Carolinea Geographica **46 (**2), 21-28. http://dx.doi.org/10.14712/23361980.2014.11

Herath, J., Gebremedhin, T.G. and Maube, B.M. (2011): A Dynamic Shift Share Analysis of Economic Growth in West Virginia. Journal of Rural and Community Development **6**, 155-169.

Kiser, D. (1992): A Location Quotient and Shift Share Analysis of Regional Economies in Texas. Unpublished MSc dissertation. San Marcos TX: Southwest Texas State University. Available at: https://digital.library.txstate.edu/bitstream/handle/10877/3571/fulltext.pdf (accessed 14 March 2015).

Klein, D., Kies, U. and Schulte, A. (2009): Regional employment trends of wood-based industries in Germany´s foster cluster: a comparative shift-share analysis of post-reunification development. European Journal of Forest Research **128**, 205-219. http://dx.doi.org/10.1007/s10342-009-0258-6

Kowalewski, J. (2011): Specialization and employment development in Germany: An analysis at the regional level. Papers in Regional Science **90**, 789-812. http://dx.doi.org/10.1111/j.1435-5957.2011.00355.x

CzSO (2012): Malý lexikon obcí ČR – 2012 [Small lexicon of municipalities ČR – 2012] [www document]. https://www.czso.cz/csu/czso/maly-lexikon-obci-cr-2012-1kd2vridet (accessed 14 March 2015).

Marsden, T. (1995): Beyond Agriculture? Regulating the New Rural Spaces. Journal of Rural Studies **11**, 285-296. http://dx.doi.org/10.1016/0743-0167(95)00027-K

Mason, S. (2009): Regional industry specialisation or regional industry diversification: is one better than the other? Labour underutilisation: unemployment & underemployment: 11th annual conference of the Centre of Full Employment and Equity,

Newcastle, NSW, Australia, 4-5 December 2009.
Mason, S. and Howard, D. (2010): Regional industry diversity and its impact on regional unemployment. Proceedings of 12th Path to Full Employment/17th National Unemployment Conference, Newcastle, NSW, Australia, 2-3 December 2010.
Mayor, M.F. and López Menendéz, A.J. (2005): Spatial shift-share analysis: new development and some findings for the Spanish case. Paper presented at 45th Congress of the European Regional Science Association, Amsterdam, the Netherlands, 23-27 August 2005.
Mitchell, W., Myers, J. and Juniper, J. (2005): Extending Shift-Share Analysis to Account for Spatial Effects: A Study Using Australian Census Data. Working Paper No. 05-19. Callaghan, NSW, Australia: Centre of Full Employment and Equity.
Nissan, E. and Carter, G. (2010): States´ Nonagricultural Employment at the 3-Digit North American Industry Classification System (NAICS) Level. The Journal of Regional Analysis & Policy **40,** 71-83.
OECD (1996): Territorial Indicators of Employment. Focusing on Rural Development. Paris: OECD.
OECD (2006): The New Rural Paradigm: Policies and Governance. Paris: OECD.
OECD (2010): OECD Regional Typology. Paris: OECD.
Perlín, R. (2010): Theoretical Approaches of Methods to Delimitate Rural and Urban Areas. European Countryside **4**, 182-200. http://dx.doi.org/10.2478/v10091-010-0013-5
Porter, M. (1998): Clusters and the new economics of competition. Harvard Business Review **76**, 77-90.
Porter, M.E., Ketels, C.H.M., Miller, K. and Bryden, R.T. (2004): Competitiveness in Rural U.S. Regions: Learning and Research Agenda. Boston MA: Harvard Business School.
Post, J. and Terluin, I. (1997): The Changing Role of Agriculture in Rural Employment, in R.D. Bollman and J.M. Bryden (eds), Rural Employment. An International Perspective. CAB International, 305-326.
Potomová, J. and Letková, J. (2011): Problémy identifikácie potenciálnych odvetví vhodných pre vznik a rozvoj klastra [Problems in identifying potential sectors suitable for the formation and development of clusters]. Acta Geographica Universitatis Comenianae **55**, 93-113.
Ray, M.A. and Harvey, J.T. (1995): Employment Changes in the European Economic Community: A Shift-share Analysis. The Review of Regional Studies **25**, 97-110.
Sotte, F. (2005): European Rural Development Policy and Territorial Diversity in Europe. Paper presented at the international symposium 'Territoires et enjeux du développement régional', Lyon, France, 9-11 March 2005.
Spilková, J. and Perlín, R. (2013): Farmers´ markets in Czechia: risks and possibilities. Journal of Rural Studies **32** (10), 220-229. http://dx.doi.org/10.1016/j.jrurstud.2013.07.001
Spilková, J., Fendrychová, L. and Syrovátková, M. (2013): Farmers' markets in Prague: A new challenge within the urban shopping scape. Agriculture and Human Values **30** (2), 179-191. http://dx.doi.org/10.1007/s10460-012-9395-5
Trendle, B. (1999): Industrial diversification and regional employment stability – A framework for analysis. Paper presented at the 1999 ANZRSAI annual conference in Newcastle, NSW, 19-22 September 1999.
Trendle, B. (2006): Regional economic instability: the role of industrial diversification and spatial spillovers. Annals of Regional Science **40**, 767-778. http://dx.doi.org/10.1007/s00168-005-0055-1
Ward, N. (2006): Rural development and the economies of rural areas, in J. Midgley (ed.), A New Rural Agenda. Newcastle Upon Tyne: IPPR North, 46-67.
Wilson, G.A. (2001): From productivism to post-productivism … and back again? Exploring the (un)changed natural and mental landscapes of European agriculture. Sociologia Ruralis **26**, 77-102. http://dx.doi.org/10.1111/1475-5661.00007
Woods, M. (2005): Rural Geography. London: SAGE.