Region to Region Comparison of Selected Social Services for Senior Citizens

Abstract

This contribution deals with the topic of certain social services provided on the level of and by the Czech Republic (CR) administrative regions. This contribution is focused senior citizens (elderly) target group. The objective of a background study executed for the purpose of this contribution was to identify how social services for this target group had developed with time. The objective is also to show what the mid-term tendencies in this services sector in connection with democratic developments towards population ageing are. Relevant data was acquired from Regional information service (RIS) and from the Ministry of Labour and Social Affairs of the CR (MPSV CR). The acquired relevant data covers the period from year 2008 to year 2013. Despite the finding that total expenditures disbursed for the mapped services grew in absolute amounts, in relative amounts it was not so and for some mapped indicators we even witnessed the decline. This is the case for instance with the indicator "number of homes for the elderly per 100 000 inhabitants" or the indicator "number of places in homes for the elderly per 100 000 inhabitants". In this contribution we present also a comparison of regions regarding the selected mapped indicators. The comparison is done with the use of cluster analysis. With regard to the trend of population ageing it is obvious that to meet the needs of seniors shall, in the future, consume increasing portions of the public budgets.

1 Introduction

In the CR social services are administered by the MPSV CR. This Ministry budget expenditure exceeds 500 billion CZK (in year 2013 it was 512 billion CZK). The total amount of expenditures paid by this Ministry to finance social services provided under par. 34 of Act 108/2006 Coll., that is the social services discussed in this contribution, reached 23.5 billion CZK in year 2013 [12]. With regard to the expected demographic development in our country and with regard to the population ageing it is anticipated that there shall be increasing problems to provide and to finance all required services for our citizens in need. The objective of this article is to illustrate the development of the number of selected social services for senior citizens with regard to the increasing number of senior citizens in the individual CR regions. This article should thus contribute to the description of the existing situation in this area and to contribute to looking for possible solution of this situation. This area has recently been engaged in many soures [3, 9, 13].

From the demographic point of view changes in age structure are the result of general civilization development. This development is linked to changes in reproduction behaviours that are translated into birth rate and mortality rate, but also in other demographic processes. Based on some forecasts the CR, in the half of the 21st century, can have, together with Italy and Greece, the highest share of senior citizens in the world. In the coming sixty years the CR will see major changes in the demographic structure of its population. These changes shall be caused by the continuing trend of population ageing that is existing due to longer life expectancy combined with low birth rate. According to the CZSO data people over 65 years of age may represent in year 2030 22.8% of the entire population, in year 2050 31.3% which represents about 3 million people. The number of the most senior inhabitants shall increase in the fastest rate. In year 2050, based on CZSO prognostic data, there shall be about half a million inhabitants of age 85 and higher [9] (according to [14] in year 2014 it was as follows: persons 65 years and older - 1 880 406; 85 years – 35 010; 90 years - 14 637; 95 years – 2 274 and 99 years plus – 1 152

inhabitants). In Fig. 1 there is illustrated the development of the number of inhabitants of age 65 plus. Based on the current situation it is clear that the number of old people growth both in the absolute and in the relative terms. And at the same time the share of children and young people in the population declines. Thus we can talk here about both the absolute and the relative population ageing (an estimate of mortality rate is solved e.g. in [7]). What regards demographic trends in the European Union there is visible the pattern of combination of increasing length of life in combination with extremely low level of birth rate [9].

In connection with the population development there can be expected a major increase in the possibility to live longer in the higher age. Older population shall be on average healthier, but it shall suffer from chronic and degenerative health problems and that shall translate itself into lack of self-sufficiency. This will lead to increasing society costs and to increased health care costs as well as social services costs [9].

Figure 1. Number of inhabitants projection for the CR for age group 65 plus (Source: Processed based on [14])
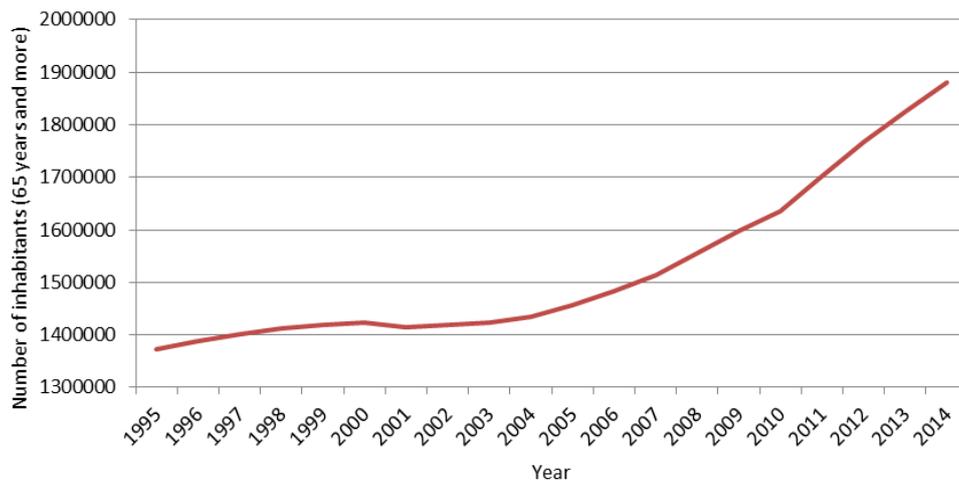
A social service is an activity or a set of activities according to [16] providing for assistance and support to individual persons in order to allow for their social integration or to prevent their social exclusion. In the wider concept social services are provided to people that are socially handicapped with the objective to improve the quality of their lives or to integrate them into society in the maximum extent. Social services take into consideration both the person who uses the services as well as the family of the client person [5, 11]. Social services must be provided with the best intention for the recipient and in the relevant quality so that human rights and fundamental freedoms of the persons are met [5, 16].

Social services have different categories according to the form in which they are provided [16] live-in (stay-in) services, outpatient services and field services. Live-in services are services connected with accommodation in social services facilities. Outpatient services are provided to people who are able to come into social services centres. Accommodation is not provided under this type of service. Field services are provided to a person in his/her natural social environment [5, 16] (e.g. care taker services - the objective of this service is to provide for the basic live needs of the client, to support independent and self-sufficient life of the client in his/her home, to keep in contact with social environment and to prevent, for the maximum length of time, the need to place the client into an live-in social care facility [5, 13].

The following types of facilities are facilities providing services to senior citizens [5] e.g. day care centres (here outpatient services are provided to persons with lower self-sufficiency caused by age, chronic disease or health handicap whose situation requires external assistance by a third person), day stay-in facilities (outpatient services are provided here to patients with lower self-sufficiency due to age or health handicap and to persons with chronic mental health handicap whose situation requires regular assistance by a third person) and week live-in facility (they provide living-in services to people with lower self-sufficiency due to age or health

handicap and to persons with chronic mental health handicap whose situation requires regular assistance by a third person), homes for persons with health handicap (facilities providing live-in services to people with lower self-sufficiency due to health handicap whose situation requires regular assistance by a third-party person), retirement homes (live-in facilities providing services to persons with lower self-sufficiency whose situation requires regular assistance by a third party person) and homes with special regime (live-in facilities for persons with lower self-sufficiency due to chronic mental health handicap or due to dependency on addictive substances and for persons with old-age Alzheimer dementia and with other types of dementia who have lower self-sufficiency due to these health problems and whose situation requires regular assistance by a third person. The regime of the provision of these services is tailor-made to the specific needs of these persons [16].

2 Material and Methods

Collection of data can be done from various sources [10]. Here we have used available databases to acquire the data and we have executed an analysis of this data utilizing selected methods. This analysis is focused primarily on social services for seniors.

2.1 Data collection

The data has been collected from [12, 14] for the period 2008 to 2013 and for the individual 14 regions of the CR. The following indicators (attributes) have been observed focusing primarily on seniors (population of age 65 plus years of age and older): retirement homes, day stay-in facilities and homes with special regime, number of places in retirement homes, number of places in day stay-in facilities, number of places in homes with special regime. Homes with caretaker services have not been observed due to lack of available data (available are only data for years 2008 – 2010). The total number of inhabitants of age 65 plus in the individual CR regions was another important indicator.

In order to be able to compare the acquired data we have created a set **A** = { $a_1, a_2, ... , a_6$ } of derived indicators (attributes, indicators) for years 2008 – 2013 where a_1 is number of retirement homes per 100 000 seniors; a_2 is the number of day stay-in facilities per 100 000 seniors; a_3 is the number of homes (facilities) with special regime per 100 000 seniors; a_4 is the number of places in retirement homes per 100 000 seniors; a_5 is the number of places in day stay-in facilities per 100 000 seniors; a_6 number of places in homes with special regime per 100 000 seniors. The provided data represents time series for the period from year 2008 to year 2013 for individual CR regions.

Simple time series dynamic measures [1] enable to characterize the basic features of "behaviour" of the time series and to formulate certain criteria for their modelling. Among the basic dynamic measures belong the absolute increment and the average absolute increment. The growth co-efficient k_T (denominated also as the growth rate) is an important measure of the time serious dynamic, such an important measure is also the average growth rate k_{Aver} , the relative increment δ_T and the average relative increment δ_{Aver} :

$$k_T = \frac{y_T}{y_{T-1}}, \ T = 2,3,...,n \ ; \ k_{Aver} = \sqrt[n-1]{\frac{y_n}{y_1}}; \ \delta_T = \frac{y_T}{y_{T-1}} - 1; \ \delta_{Aver} = k_{Aver} - 1. \qquad (1)$$

2.2 Data analysis

The relevant data have been analysed based on the already mentioned time series dynamic [1, 2, 17]. The data have been analysed both from the point of view of the comparison of the mapped indicators for the entire CR and for comparison of the individual regions. The starting point for the analysis is Tab. 1 and the calculations elaborated based on the original data describing the number of inhabitants of age 65 plus and based on the original values of the observed indicators (that is without the re-calculation per 100 000 seniors rate).

Based on the values of the relative increments of the stated indicators calculated from years 2012 and 2013 it can be observed that there exists a more prominent increase in the value of a_3 and a_6, both values inform about the number of homes (facilities) with special regime per 100 000 seniors (a_3 = 6%) and at the same time about the number of re-calculated places in these facilities (a_6 = 9%). Also the indicator a_2 shows and increase by 1%, this indicator represents the number of day stay-in facilities per 100 000 seniors.

Table 1. Selected indicators of dynamic rates a_1, a_2, ..., a_6 (Source: Authors)

Rate of Dynamics	Attributes					
	a_1	a_2	a_3	a_4	a_5	a_6
Average growth co-efficient	0.99	0.99	1.05	1.05	0.91	1.07
Average relative increment (2008 to 2013) in %	-1%	-1%	5%	- 3%	-9%	7%
Growth co-efficient (2012 to 2013)	0.98	1.01	1.06	0.97	0.96	1.09
Relative increment in % (2012 to 2013)	-2%	1%	6%	-3%	-4%	9%

Despite the fact that in year 2013, compared to year 2012, the number of seniors increased (there were 57 926 seniors more) as well as the number of retirement homes increased (8 more homes than in the previous year), the value of the indicator a_1 showed decline by 0.43. The stated situation represents the decline in the value of indicator a_1 by 2% in year 2013 compared to year 2012. In the observed years 2008 to 2013 this means that the number of retirement homes per 100 000 seniors declined each year on average by 1% and thus the number of re-calculated places in these homes declined by 3% annually. The values of the growth rates calculated from years 2012 and 2013 and the average growth rate for the observed indicators is demonstrated in Tab. 1. The values of indicator a_5 number of places in day live-in facilities per 100000 seniors show also a decline. From the stated information it issues that the number of seniors in the observed years saw on average each year growth by 3.25% while the number of places in day live-in facilities demonstrates on average decline by 6%. The growth rate of indicator a_5 in the individual years is presented in Fig. 2.

To identify similarities between regions (NUTS 2) on the basis of the observed indicators we can utilize the hierarchical clustering methods (HCM). The HCM could be divided according to the manner that the similarity measure is calculated. Single-link clustering method (also called nearest neighbour method), complete-link clustering method (also called the further neighbour method), average-link method etc. are examples of HCM. Dendrogram is the result of the hierarchical cluster methods [8]. It is commonly used to represent the process of hierarchical clustering. It shows how objects are grouped together step by step [4, 18]. A clustering of the data objects is obtained by cutting the dendrogram at the desired similarity level [8].

3   Results and Discussion

In Tab. 2 and 3 we can see the values of indicators showing the development of selected social services in relation to the number of seniors in the region-to-region comparison.

The average relative increment for indicator a_1 was reported only in case of the capital city Praha region (3%) and in case of Plzeňský region (2%). Pardubický region and Moravskoslezský region reported zero value of this indicator. All the other regions report year on year decline in the observed indicator (biggest decline reported by Ústecký region 5%, this indicator demonstarted year on year decline by 10% for years 2012 and 2013). The average relative increment of indicator a_4 returned showed negative values in all of the observed regions, the highest rate of decline are in Ústecký region (6%), Karlovarský region, Olomoucký region and Zlínský regions show year on year decline by 4% on average.

The indicator a_2 from the point of view of the average relative increment did not demonstrate any changes for Praha region, for Jihočeský region and for Moravskoslezský region. More dramatic decline was reported for Pardubický region (7%) and for Olomoucký and

Ústecký region (6%). The highest relative increment in years 2012 and 2013 was documented for Jihomoravský region (9%), Zlínský region states 7% and Liberecký region 6%. The highest average relative increment for indicator a_5 the recalculated number of places in day live-in facilities in years 2008 to 2013 (11%) was indicated for Karlovarský region, positive value of 6% shows Plzeňský and Královehradecký regions (2%). The remaining regions, with the exception of Liberecký region (0%) showed the decline of the average relative increment. The biggest decline was identified in Olomoucký region (26%), in Zlínský region (19%) and in Ústecký region (17%). When comparing the value of relative increment (for years 2012 and 2013) there was reported a dramatic decline (by 38%) for Pardubický region, by 29% for Jihočeský region and by 23% for Ústecký region. A dramatic increase was demonstrated in Olomoucký region, by 20%.

Figure 2. Rate of growth for indicator a_5 for the period 2008 to 2013 (Source: Authors)
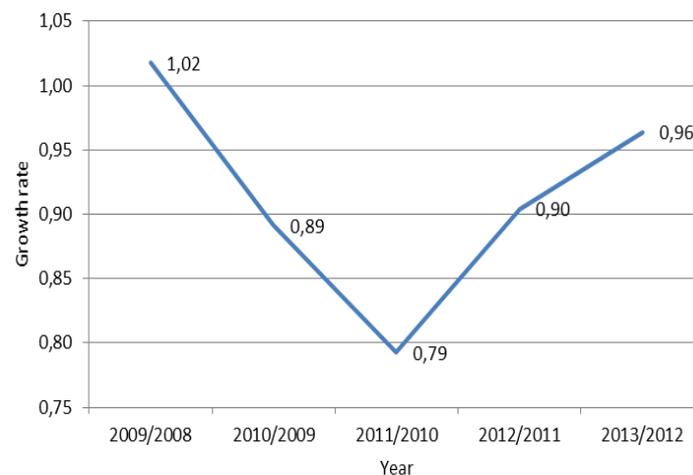
The values of the average relative increase in indicator a_3 are dramatically different from the previous indicators a_1 and a_2. In the period 2008 to 2013 there was average year on year increase in the capital city Prague by 25%, in Zlínský region by 16%, in Plzeňský region by 14% and Středočeský region by 11%. There was reported decline only in two regions, Jihomoravský region by 1% and Liberecký region by 4%.

The highest relative increase of indicator a_3 (from years 2012 and 2013) is reported by Prague region (by 37%), Pardubický region (29%) and Plzeňský region (25%). The lowest values were reported in Liberecký region (4%), Jihočeský region and Vysočina region (3%) and Moravskoslezský region (3%). Recalculated values of the number of places in these facilities per 100 000 seniors (a_6) demonstrate relative increment (calculated from years 2012 and 2013) by 37% in the Prague region, 19% in Plzeňský region, 18% in Olomoucký region and 13% in Ústecký region. Decline by 6% is demonstrated only in Liberecký region, that is the sole region stating year on year decline by 3% in the observed years 2008 to 2013.

Clustering was realized in IBM SPSS Statistics and available methods of HCM were used. Very similar dendrograms were achieved by an application of complete-linkage and Ward's method. The result of complete-link clustering can be seen in the Fig. 3. By [8] this method it produces more compact clusters than the single-ling clustering methods and produces more useful hierarchies in many applications.

The Fig. 3 shows result of clustering on the basis of the average relative growth in % of indicators a_1, ..., a_6. The interpretation of this dendrogram is the following: regions that are similar are connected by a straight line connecting very low; region linked far have little resemblance. There are three visible groups of regions. There are regions Vysočina, Moravskoslezský, Jihomoravský and Liberecký in the first one. The second group is represented by regions Ústecký, Zlínský, Jihočeský, Pardubický and Olomoucký. Regions Středočeský, Královéhradecký, Plzeňský and Karlovarský are in the last group of clustering. Prague, the

capital is a part of this third group, but there is a greater rescaled distance (the stage of clustering is 11).

Table 2. Average cooeficient of growth from years 2008 to 2013 (Source: Authors)

NUTS 2	a_1	a_2	a_3	a_4	a_5	a_6
Capital city Prague	1.03	1.00	1.25	0.99	0.94	1.14
Středočeský region	0.98	1.02	1.11	0.97	0.95	1.10
Jihočeský region	0.97	1.00	1.04	0.98	0.84	1.04
Plzeňský region	1.02	0.98	1.14	0.98	1.06	1.14
Karlovarský region	0.99	1.01	1.08	0.96	1.11	1.09
Ústecký region	0.95	0.94	1.10	0.94	0.83	1.12
Liberecký region	0.97	1.03	0.96	0.98	1.00	0.97
Královéhradecký region	0.99	1.04	1.05	0.99	1.02	1.08
Pardubický region	1.00	0.93	1.07	0.98	0.86	1.06
Region Vysočina	0.99	1.03	1.02	0.97	0.93	1.03
Jihomoravský region	0.99	0.99	0.99	0.97	0.93	1.04
Olomoucký region	0.98	0.94	1.01	0.96	0.74	1.04
Zlínský region	0.97	0.97	1.16	0.96	0.81	1.14
Moravskoslezský region	1.00	1.00	1.05	0.98	0.92	1.01

Table 3. Growth coefficient from years 2012 to 2013 (Source: Authors)

NUTS 2	a_1	a_2	a_3	a_4	a_5	a_6
Capital city Prague	1.02	0.98	1.37	1.00	0.96	1.37
Středočeský region	0.99	1.02	1.11	0.97	1.03	1.08
Jihočeský region	0.97	0.97	0.97	0.96	0.71	1.06
Plzeňský region	0.97	0.97	1.25	0.94	1.03	1.19
Karlovarský region	1.03	0.96	1.12	1.03	0.96	1.03
Ústecký region	0.98	0.96	1.02	0.97	0.77	1.13
Liberecký region	0.90	1.06	0.96	0.92	0.96	0.94
Královéhradecký region	1.03	1.03	1.09	0.99	0.93	1.02
Pardubický region	0.97	0.97	1.29	0.96	0.62	1.08
Region Vysočina	0.97	1.03	0.97	0.99	0.98	1.01
Jihomoravský region	0.99	1.09	1.03	0.97	1.01	1.07
Olomoucký region	0.97	1.03	1.18	0.97	1.20	1.18
Zlínský region	1.00	1.07	1.04	0.99	1.02	1.07
Moravskoslezský region	0.97	1.00	0.97	0.96	1.01	1.05

For the first cluster year on year decline of the average growth coeficient for indicators a_1, a_4 and a_5 is typical (this is concerns the status of social service retirement homes and the number of places in these homes including places in day live-in facilities). The indicator a_3 shows both increasing and decreasing values in this cluster and a very slight increase is demonstated in indicators a_2 (number of day live-in facilities per 100 000 seniors) and a_6 (number of places in homes with special regime per 100 000 seniors). The second cluster shows a decline in the value of the observed coefficients a_1, a_2, a_4 and also a_5 (indicator a_5 has a high value of decline year on year (-14 % to -26 %). The growth values are typical for a_3 and a_6 (year on year on average there is increase in the number of retirement homes with special regime per 100 000 seniors and in recalculated number of places in those homes). In the third cluster there is observed a

dramatic growth of values in the observed coefficient for a_3, a_6 which is related to homes with special regime and decline at a_4 (number of places in retirement homes per 100 000 inhabitants for all regions).

Figure 3. Dendrogram using complete-link clustering (Source: Authors)
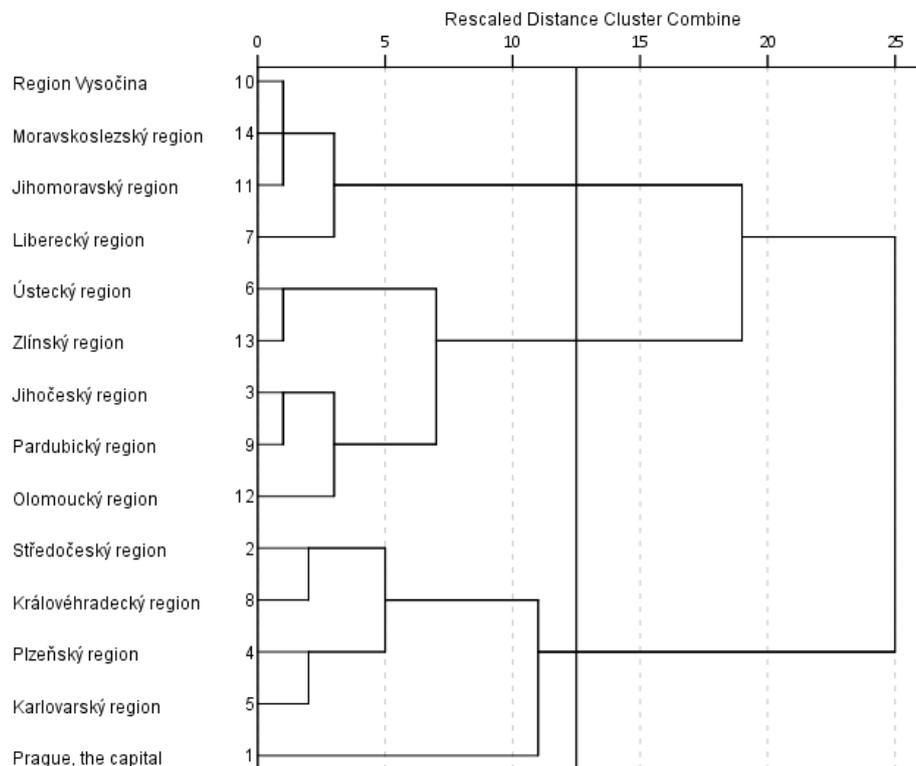
4 Conclusions

The Twentieth century began as the "century of the child" and it ended as the century of the elderly. These days one quarter of the population is in the old-age pension age. Old-age is considered to be a social category and the existing society puts aside anything that shows less effectivity or shows some signs of insanity [3, 9]. The expected development of the number of inhabitants will have, next to other impacts, also the impact on all social systems, including the old-age pension system [3, 9, 15].

From the socio-economic point of view the ageing of the population and the decline in the birth rate causes insufficient fullfiling of insurance funds and at the same time have higher requirements for the pension payments. The provision of health care to older citizens also becomes an important issue.

Older people also experience change in their needs and requirements. There are changes in partnership patterns, family and society ties and relations as well as changes in health situation. We have to see their needs in a complex manner since the saturation of one need may influence the provision of another one. For instance moving to a senior home facility can improve the feeling of safety or self-fullfilment on the one hand, but it can break social relations the other hand [6].

In this contribution we have analyzed data from RIS and the MPSV CR for years 2008 to 2013. It has been proven that the growth of the selected indicators in absolute values is a decline in relative values. This is valid for retirement homes, day live-in facilities, number of places in retirement homes and number of homes with special regimes.

In any following research it should be good to focus on analysing developments and effectiveness of senior homes facilities and of homes with special regimes. These two types of

homes represent the highest capacity in social services [12] and also require the highest portion of social services expenditures.

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