

## **Impact of Economic Development of the Czech Republic in the Years 2005-2012 on the Living Standards of Seniors**

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**ABSTRACT:** *The present account deals with an investigation into the living standards of seniors and their development in the selected period 2005 – 2012. The basic data sources best serving for this purpose are two European methodologies – the European Union Statistics on Income and Living Conditions and the Classification of Individual Consumption by Purpose. The data are recalculated for the whole population of the Czech Republic with the help of the iteration method of scale calibration. For the purpose of income analysis, the households of seniors are sorted into quintiles and the level and depth of poverty are calculated for them. Income inequality is assessed on the basis of the Gino coefficient. Monitoring of the history of seniors' incomes is based on regression models and ANOVA has been used to find out about the conclusiveness of the effects of the factors of place of living and education on seniors' incomes. Subsequently, the structure of expenditures pursuant to the defined 12 categories is studied. Subjective opinions are expressed with the help of material deprivation indicators. The individual indicators are compared to the results for the whole population of the Czech Republic. The output is represented by a specification of problem areas of the lives of Czech seniors related to the material side of their living standards.*

**KEYWORDS** - *income, elderly, consumption, income inequality, education, place of living, living standards*

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### **I. INTRODUCTION**

Changes in economic development in the Czech Republic in the years 2005 – 2012 and above all their social impact on selected population groups suggest a number of questions concerning the correctness of the emphasis on the dynamics of economic growth without the same emphasis on the social progress of society. The period of financial crisis and its manifestations in individual EU countries showed that GDP dynamics themselves are not a reliable indicator of the stability of economic development in society. Professional discussion on this theme has been led above all by Joseph E. Stiglitz, Amartya Sen, Jean-Paul Fitoussi and others. Impulses for these discussions include worsening parameters of environmental quality, education level, healthcare and social care, and also the results of surveys into household incomes as the basic assumption for human need satisfaction [1]. The economic progress of society, its stability and social development have differing negative impacts on individual population groups. The greatest threat is faced by socially weak groups, that is, the unemployed, senior households, incomplete households and households with a greater number of children. The issue of economic and social progress cannot be addressed without consideration of the ongoing significant demographic changes not only in the Czech Republic, but also across Europe. It is the very size of individual population segments based on age that brings a number of significant factors manifesting themselves in the economic and social areas. At the turn of 20th and 21st centuries, not only the Czech Republic but also the whole of Europe was aware of the results of censuses concerning the age structure of the global population and its accelerating ageing. Population ageing is one of the most significant demographic changes bringing about an exponential increase in world population, overpopulation of certain areas, migration or changes in mortality rates [2]. Seniors represent a very dynamically developing segment considerably affecting the whole economy of the Czech Republic. The increase in average age will bring about growing demands on the pension, social and healthcare system, where a considerable increase may be expected in the coming years. These basic systems of every advanced state will not be able to avoid radical changes which must prevent population ageing from becoming a critical economic and social problem in the Czech Republic. Ageing may be viewed as a multidimensional process whose impact is not subject of any consumer behaviour research. The

senior population group cannot be said to be a homogeneous segment identifiable on the basis of biological age only [3].

There are a number of factors suggesting that it is a heterogeneous segment with a huge potential but also with many economic, psychological, biological and social aspects affecting personal consumption. Phenomena of critical importance for this group include financial resources and health condition. Financial resources, i.e. income (old age pension), may be considered one of the key indicators for assessing the living standards of the population of a given state. Income determines consumer preferences in the purchasing process, ways of spending leisure time, household equipment as well as education. Therefore, income significantly affects the living standards of consumers. It is generally assumed that the senior segment belongs among those households threatened by low income and approaching the boundary of poverty. This contribution aims to investigate the senior segment and use the results of the investigation to identify problems related to the needs of seniors and their satisfaction, which can be expected in future regarding demographic and economic development and applied social policy. To this end, the authors will also use knowledge obtained by examination of the income issue and living standards in society (the economic development of society expressed as the growth of GDP and the income situation of households, the number of households at risk of poverty, the depth of poverty and the rate of income inequality have an identical development trend. It will be different if the economic development trend change [4]. Stávková et al [4] add that a very powerful instrument which can significantly reduce income problems of households is social policy. However, it is not only how much is spent on social protection, but also towards which social groups the social policy is oriented. If it is incorrectly focused, this generates economic inactivity and slows down economic growth, and thus reduces the standard of living).

## II. METHOD

The source data have been obtained according to two European methodologies enabling a comparison of EU countries. They are the European Union Statistics on Income and Living Conditions (EU SILC) [5] and the Classification of Individual Consumption by Purpose (COICOP). The investigations have been performed by the Czech Statistical Office and the statistical office of the European Commission, Eurostat. The investigations of EU SILC take net household income as the basic variable, with individual income used in selected cases [6]. The number of Czech households involved in the investigation in individual monitoring years, the number of senior households, the number of individuals and the number of individual seniors included are shown in the following Table 1.

Table 1: Numbers of households and individuals included in the investigation by EU SILC in the Czech Republic

<i>Number/Investigation</i>	<i>SILC 05</i>	<i>SILC 06</i>	<i>SILC 07</i>	<i>SILC 08</i>	<i>SILC 09</i>	<i>SILC 10</i>	<i>SILC 11</i>	<i>SILC 12</i>
<b>households in SILC set</b>	4,351	7,483	9,675	11,294	9,911	9,098	8,866	8873
<b>- of which senior households</b>	2,519	4,357	5,803	6,916	6,021	5,598	5,699	5,807
<b>recalculation for households across the Czech Republic (in thousands)</b>	4,013	4,028	4,043	4,082	4,116	4,15	4,181	4,255
<b>individuals in SILC set</b>	10,333	17,83	23,059	26,933	23,302	21,379	20,629	20,238
<b>recalculation for individuals in Czech Republic (in thousands)</b>	10,129	10,161	10,195	10,229	10,34	10,403	10,435	10,293
<b>- of which seniors (in thousands)</b>	2,091	2,046	2,071	2,102	2,164	2,188	2,288	2,347
<b>percentage of seniors in the Czech Republic</b>	20.64	20.14	20.32	20.55	20.93	21.3	21.93	22.80

The data from the investigation were recalculated for the total population of the Czech Republic with the help of the iteration method of scale calibration, minimising the difference between the known values of the selected characteristics and the recalculated values of the selection sample (table 1). In harmony with the methodology recommended by the European statistical office (Eurostat), the system of integrated scales was also used, i.e. a set of recalculated coefficients applicable to parallel processing of outputs both for households and for individuals. This recalculation eliminates the effect of non-response, i.e. bias resulting from the different compositions of households not included in the investigation as well as under- or overestimated data of the investigated households. The households are evaluated by income and divided into quintiles. Following ascending sorting of incomes per person, cumulative values of the empirical distribution function may be used

for specification of various income characteristics, quintile income distribution, income differentiations, levels of poverty, etc.

The expenditure data use data on total expenditures for 12 items pursuant to COICOP, i.e. food and non-alcoholic drinks, alcohol and tobacco, clothing and footwear, living, water and energy, household equipment, health, transport, post and telecommunications, recreation and ultra, education, board and lodging, other goods and services. Progress of development of household income in the years 2005 – 2012 is expressed with the basic model of linear regression analysis where the median value of the dependent variable Y is bound with one independent variable T as expressed by the following formula:

$$E(Y) = a + bT + \varepsilon_t \quad (1)$$

where b is the straight line directive and  $\varepsilon_t$  is the residual component.

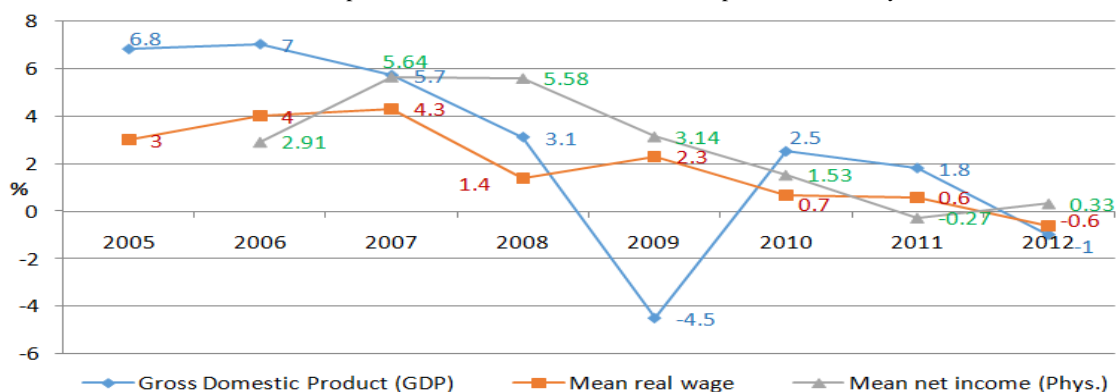
Regression models are used to express the income situation of households of the Czech Republic as a whole and in the selected 1st quintile for median values, and t-statistics are used to specify the adequacy of regression function parameters. Finding out the conclusiveness of the influence of factors such as the place seniors live and the level of education on the amount of old age pension (using an investigation into individuals) is based on the ANOVA method application.

- (A) Type of living with 4 levels – a1 - capital city of Prague, a2 - regional capital, a3 - municipal, a4 - rural living,
- (B) achieved education with 6 levels – b1 - elementary, b2 - apprentice without school-leaving examination, b3 - complete secondary education with school-leaving examination, b4 - higher professional education, post-secondary courses, b5 - university, b6 - post-graduate (doctoral) courses

The calculations were made with the statistical software STATISTICA12.

### III. SUBJECT OF INVESTIGATION

The Czech economy went through many differing stages in the monitored period. They included dynamic growth as well as economic crisis. To analyse household conditions and describe living standards on the basis of objective indicators, an analysis of household income is used for it is income that is most closely connected with the living standards of households and their lifestyle. The performed income analyses must be commented on in the context of economic growth of the Czech Republic. Economic growth in the period 2005 – 2012 is described with the help of the following indicators: net income, mean wage and gross domestic product as the macro-economic indicator (GDP), and their values are expressed by graphical means (fig. 1). Year-on-year values of the Czech economy tended to grow in the years 2005 and 2006, when GDP grew year-on-year by up to 7.0 %, which was a record year-on-year GDP growth in the modern history of the Czech Republic. In the year 2007, household expenditures for end consumption increased year-on-year by 4.0 %, which is related to household demand, encouraged by reduced unemployment (6.62 %) as well as by increased income. In 2008, the Czech Republic was affected by the global economic situation affected by financial crisis as early as in August 2007. Year-on-year GDP growth dropped to 3.1 %. Household expenditures for end consumption equalled 3.0 %, which is also related to the considerable inflation (6.3 %) and very low year-on-year increase of real wages (1.4 %). In 2008 the positives included a record registered unemployment rate ranging around 5.44 %. The year 2009 was marked by economic recession, and not only in the Czech Republic. GDP continued to decrease (down to -4.5 %), accompanied by a considerable decrease in household expenditures for end consumption. This trend continued to 2012 [7]. Detailed analyses of 2011 show that households limited their expenditures on goods as well as services and the state had to increase allowances for people in material need. Mean gross monthly wage was CZK 23,726. Old-age pensioners received CZK 10,536 on average (CZK 500 more than in the previous year). Despite that, living costs of old-age pensioners in the consumption basket increased by nearly 3 % [8]. In 2012, this negative trend continued with a further decrease in economic performance. GDP ranged in negative figures together with expenditures for end consumption of households. For the first time, the year -on-year indicator of mean real wage decreased, too [7]. Even though the mean wage increased year-on-year in 2012 by CZK 655 to CZK 25,101, which meant an increase of 2.7 % in comparison with two years before, the whole effect of wage growth was absorbed by inflation, which reached 3.3 %. This in reality meant an overall wage drop of 0.6 % [9]. Mean old age pension level reached CZK 10,770, which represented an increase of 2.2 % in comparison with the year 2011, but in real figures it



slightly decreased (by 2.3 %). The greatest effect on price inflation was represented by housing price increase. Therefore, costs of living of senior households increased year-on-year by 4.6 % (record value since 2008).

### Figure 1: Year-on-year changes in selected indicators in the individual monitored years

The above Fig.1 shows the development of year-on-year changes in GDP, real wage and net mean income per natural person. The values of mean real wages published by the Czech statistical office correspond to the calculated year-on-year changes in net mean income from the SILC set. Just the amount of year-on-year change in net mean income in 2005 is not known for the Living Standard research was only started in that year.

Income of households is decisive for satisfaction of the needs of individual members of households and in effect for the quality of life of the population. The following Table 2 shows the history of annual income and expenditures of an average household and senior household according to the Family budget statistics (FBS).

Table 2: Annual household income and expenditures net of inflation (in-house calculations)

Characteristics (in CZK)	2005	2006	2007	2008	2009	2010	2011	2012
Net income per person on total (FBS)	106,650	111,637	117,367	121,143	124,369	125,377	123,054	125,516
Net cash expenditure per person in total (FBS)	97,316	103,051	112,134	109,211	112,334	112,085	112,142	110,870
Net income per senior in total (FBS)	95,134	98,818	104,047	104,096	109,020	112,913	118,739	116,597
Net cash expenditure per senior in total (FBS)	91,221	95,464	98,965	99,883	104,403	109,016	109,588	109,411

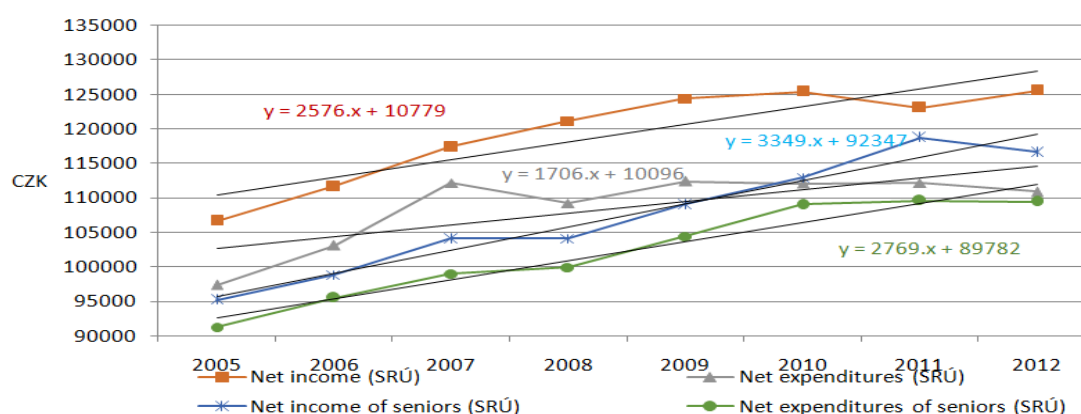


Figure 2: Annual income and expenditures net of inflation

Data in Table 2 and their graphic representation show a comparison between the income of a mean Czech household and a senior household. In the monitored period, the year-on-year increase in income was higher and expenditures grew more in senior households. The parameters of the regression function of the 7-year timeline show a year-on-year increase in income in senior households of CZK 3,367, with the same figure for other households in the Czech Republic only being CZK 2,576. A similar situation can be seen in expenditures. While expenditures of senior households increased year-on-year by CZK 2,796, this figure for other households is only CZK 2,576. This situation is logical in the area of expenditures for it follows from the structure of the consumer basket, see Fig. 3.

Table 3: Mean expenditures per person in CZK by item

COICOP items	2005		2012	
	Mean household	Senior household	Mean household	Senior household
Food and non-alcoholic drinks	18,775	22,894	19,650	23,371
Alcoholic drinks, tobacco	2,603	2,508	2,794	3,105
Clothing and footwear	5,095	2,955	4,624	2,694

<b>Housing, water, energy, fuel</b>	18,336	23,657	21,678	29,093
<b>Household equipment, repairs</b>	6,116	5,344	5,667	5,587
<b>Healthcare</b>	1,795	2,743	2,752	4,690
<b>Transport</b>	10,132	6,209	10,522	5,974
<b>Post and telecommunications</b>	4,162	3,795	4,366	3,836
<b>Recreation and culture</b>	9,673	6,807	9,330	8,210
<b>Education</b>	497	18	643	222
<b>Board and lodging</b>	4,643	2,150	5,172	2,762
<b>Other goods and services</b>	9,257	6,179	11,000	8,531
<b>Total</b>	91,084	85,259	98,198	98,075

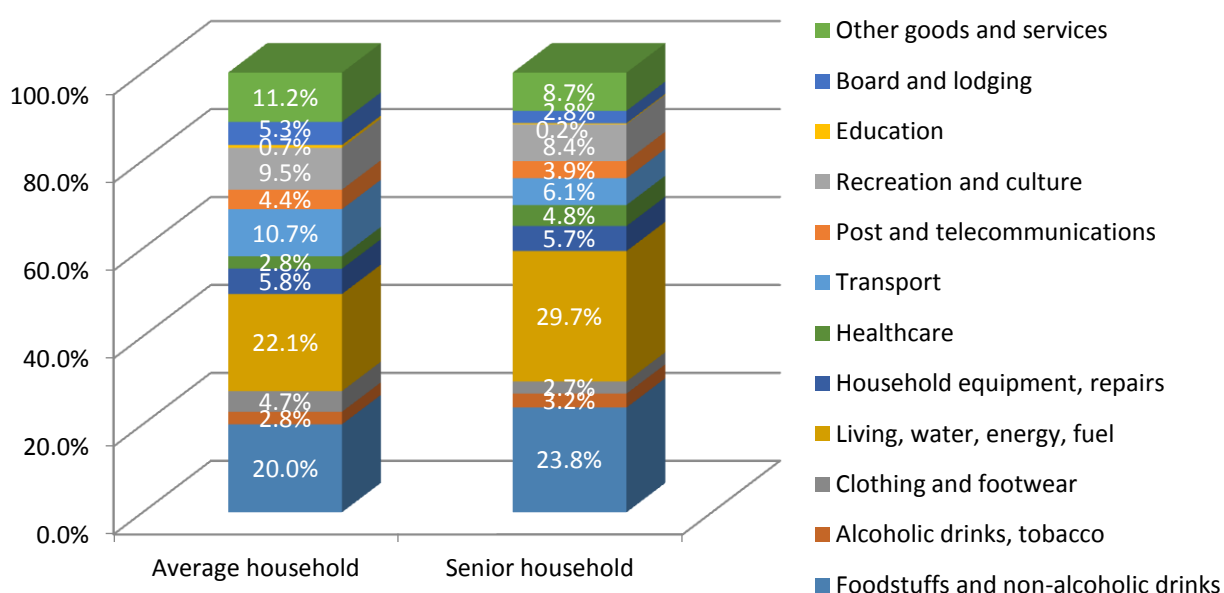


Figure 3: Structure of household expenditures

In the course of the monitored period, the structure of expenditures did not change significantly for either household type.

Table and Fig. 2 show the income situation of a mean household in both subsets - standard and senior household. As the data apply to mean households across the country, differences between low- and high-income households are significantly levelled out. That is why the income analyses are extended by an income analysis of the 1st quintile concerning the first 20 % of households sorted in ascending order by income. The progress of income and expenditure development clearly shows that income of low-income households in the Czech Republic is lower than income of senior households, and that the crisis caused a decrease in expenditures in these very households. The progress of expenditures of senior households copies the progress of income with a smaller or bigger difference but always with the income higher.

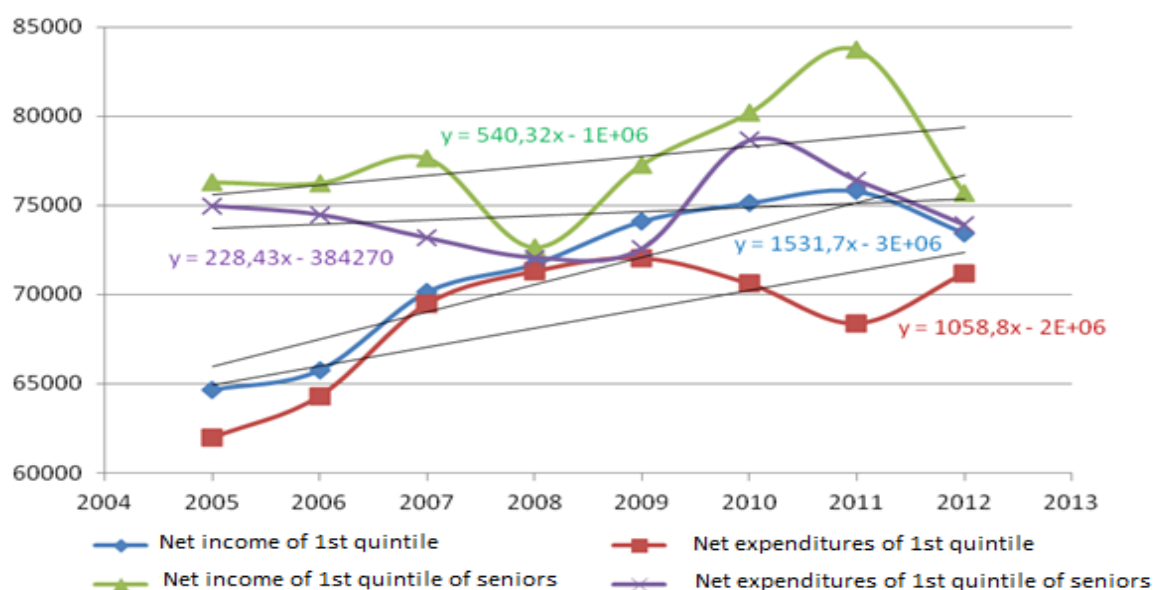


Figure 4: Income and expenditures of households of the 1st quintile

The above analyses were performed in the sense of the income situation of households in relation to household expenditures. The senior segment is to a large extent dependent on the state and its social policy. Table 3 allows for the deduction that the state is aware of this liability, for in the course of the monitored period 2005-2012 senior income grew (by 12.6 %) more than income per natural person for all Czech households (12.03 %).

This situation is respected by subjective views expressing the perception of the financial situation in both sets of respondents. Senior households expressed more pessimistic views on the sufficiency of income and management of expenditures for housing at the end of the timeline of the monitored period (tab. 4 and tab. 5).

Table 4: Sufficiency of household income in %

Characteristics		Insufficient or sufficient with great problems	Few problems or sufficient	Quite sufficient
All households	2005	29.5	59.9	10.6
	2012	31.4	59.2	9.4
Senior households	2005	29.9	61.1	8.9
	2012	34.7	57.4	7.8

Table 5: Financial burden of housing expenditures

Characteristics		Great burden	Certain burden	No burden at all
All households	2005	23.8	64.1	12.2
	2012	28.5	63.4	8.1
Senior households	2005	25.2	64.2	10.6
	2012	32.2	60.8	7.0

Data in table 6 do not confirm this negative perception. Objective information about the frequency of items of material deprivation increase (a week of holiday, meat and fish every other day, heating method etc.).

Table 6: Material deprivation

<i>Material deprivation in %</i>								
<i>Characteristics</i>	<i>A week of holiday away from home</i>		<i>Meat or fish every other day</i>		<i>Sufficient house heating</i>		<i>Unexpected expenditure</i>	
	2005	2012	2005	2012	2005	2012	2005	2012
<b>All households</b>	58.0	56.2	81.0	86.3	89.7	92.4	55.9	56.0
<b>Senior households</b>	41.7	44.9	74.7	81.2	86.6	90.1	50.0	49.9

The social policy of the Czech Republic and the viewpoint of solidarity of the pension system are also shown by the results of investigations into the number of poverty-threatened households and the depth of such poverty.

Table 7: Poverty-threatened households

<i>Characteristics</i>	<i>SILC 05</i>	<i>SILC 06</i>	<i>SILC 07</i>	<i>SILC 08</i>	<i>SILC 09</i>	<i>SILC 10</i>	<i>SILC 11</i>	<i>SILC 12</i>
<b>Persons threatened by poverty (in %)</b>	10.36	9.8	9.6	9.1	8.6	9.0	9.8	9.6
<b>Persons threatened by poverty (in thousands)</b>	1049.3	995.6	980.0	926.6	886.9	937.3	1022.3	990.3
<b>Number of seniors threatened by poverty (in %)</b>	8.01	9.28	7.67	9.69	10.25	9.82	9.80	9.32
<b>Number of seniors threatened by poverty</b>	177.1	209.1	176.8	225.2	241.9	235.2	235.3	225.9

Table 8: Depth of poverty in CZK

<i>Characteristics</i>	<i>SILC 05</i>	<i>SILC 06</i>	<i>SILC 07</i>	<i>SILC 08</i>	<i>SILC 09</i>	<i>SILC 10</i>	<i>SILC 11</i>	<i>SILC 12</i>
<b>Average household</b>	0.232	0.210	0.219	0.219	0.223	0.223	0.225	0.123
<b>Senior household</b>	0.114	0.126	0.126	0.136	0.136	0.126	0.139	0.146

The calculations show a nearly identical percentage of poverty-threatened households in both monitored subsets, with the depth of poverty of average households nearly twice the depth of poverty of senior households.

Living standards of seniors are in addition strongly affected by one more significant factor, which is the merit factor affecting specification of the amount of old-age pension. The old-age pension rate specified by the state does not respect the income inequality of the economically active population. This follows from the calculation of the indicator of income inequality, Gini coefficient, in table 9.

Table 9: Gini coefficient

<i>Characteristics</i>	<i>SILC 05</i>	<i>SILC 06</i>	<i>SILC 07</i>	<i>SILC 08</i>	<i>SILC 09</i>	<i>SILC 10</i>	<i>SILC 11</i>	<i>SILC 12</i>
<b>Gini coefficient seniors</b>	0.145	0.154	0.15	0.155	0.161	0.159	0.168	0.162
<b>Gini coefficient</b>	0.261	0.253	0.253	0.249	0.253	0.248	0.253	0.248

The Gini coefficient, expressing the income inequality of average Czech households, reaches double the value for the senior segment. This is another argument for seniors who experience considerable changes in living standards as a consequence of the state-specified amount of their old-age pension and feel dissatisfied, for the approach to the merit factor, which is suppressed in the system of old-age pension calculation, is considered by them as unjust in relation to the amount of their state levies in the period of their economic activity.

This is also the decisive reason for the work engagement of seniors (see table 10).

Table 10: Working and non-working seniors

<i>Characteristics</i>	<i>SILC 05</i>	<i>SILC 06</i>	<i>SILC 07</i>	<i>SILC 08</i>	<i>SILC 09</i>	<i>SILC 10</i>	<i>SILC 11</i>	<i>SILC 12</i>
<b>Total number of working seniors (absolute figures)</b>	145,259	108,426	92,675	108,441	102,048	118,697	114,745	144,603
<b>Total number of working seniors (in %)</b>	6.95	5.3	4.47	5.16	4.71	5.42	5.01	6.16
<b>Non-working senior population (%)</b>	93.05	94.70	95.53	94.84	95.28	94.57	94.99	93.84
<b>Non-working senior population (in absolute figures)</b>	1,945,349	1,937,917	1,978,722	1,993,244	2,062,205	2,069,127	2,173,656	2,202,211

The income situation is affected by many factors, inter alia the place of living and education level. As shown in tables 11 and 12, the income of individual levels of the defined variables really differs. The results of ANOVA shown in Table 13 reveal the factor which affects the income situation of households and thus the specified amount of old-age pension.

Table 11: Breakdown of descriptive statistics - place of living

<i>Place of living</i>	<i>Mean annual income (in CZK)</i>	<i>Standard deviation</i>	<i>Variance</i>
<b>Capital city of Prague</b>	182,906	62 276.07	3.878309E+09
<b>Regional capital</b>	171,785	75 831.99	5.750491E+09
<b>Municipality</b>	164,102	53 140.84	2.823948E+09
<b>Rural place of living</b>	164,226	52 479.81	2.754130E+09
<b>Total</b>	167,136	57 933.59	3.356301E+09

Table 12: Breakdown of descriptive statistics - education level



<i>Education</i>	<i>Mean annual income (in CZK)</i>	<i>Standard deviation</i>	<i>Variance</i>
<b>Elementary education</b>	131,3230	39 407.2	1.552929E+09
<b>Apprentice</b>	139,881	41 615.9	1.731879E+09
<b>Complete secondary education</b>	156,930	78 078.1	6.096183E+09
<b>Higher education</b>	157,542	56 662.3	3.210622E+09
<b>University education</b>	217,048	144 470.8	2.087181E+10
<b>Doctoral education</b>	326,939	205 408.4	4.219260E+10
<b>Total</b>	150,396	73 410.3	5.389068E+09

Table 13: Variance analysis

<i>Examined factor</i>	<i>Levels of freedom</i>	<i>F value</i>	<i>p-value</i>
<b>Place of living</b>	3	12.47	0.00
<b>Education</b>	5	164.48	0.00

The results show that both factors significantly affect the calculated old-age pension level. The capital city of Prague and regional capitals with higher job positions differ from the rest. A similarly highly significant effect is shown by the achieved education level and the corresponding job position.

#### IV. CONCLUSION

The performed income analyses of the monitored population sets allow for the deduction that the economic progress of society in the period 2005-2012 was related to the living standards in society, of course with a certain time shift in the following sequence: Financial crisis, increasing unemployment, decreasing income per household member, decreasing total consumption. The subset of interest – senior households - was subject to a reduced speed of year-on-year income increase in the whole monitored period of 2005-2012, but despite that, this increase was higher in the senior segment (CZK 3,367) than in the average Czech household (CZK 2,576). Similarly, expenditures per senior household member were higher (CZK 2,769) than those of an average household (CZK 1,706). This fact is logical in the expenditure area due to the structure of the expenditures and the need to satisfy personal needs. The percentage of income increase is higher in the senior segment (12.6 %), with the same percentage for the average household being only 12.03 %. This fact is further multiplied by knowledge of the left-side division of the set of achieved income of Czech households. The created negatively oriented social atmosphere, derived from global economic development, more strongly affected senior households, as follows from their subjective perception and evaluation (sufficiency of their income, burden represented by housing expenditures). The results of objective investigations into the income situation and the number of monitored items of material deprivation do not correspond to this subjective evaluation (the income increase, the increase in the number of holidays, selection of foodstuffs, the method and intensity of heating are higher in senior households).

The results of individual investigations into old-age pension calculation and the above-mentioned income situation of households allow for a positive assessment of the solidarity aspect of the old-age pension system, or the social policy of the state. The objectively found equality of old-age pension amounts not respecting the income inequality of the economically active population and the expressed need for additional income on the part of some seniors then document the absence of the merit aspect. This is manifested by the dissatisfaction of a certain group of seniors who are forced to change their way of life in old age to respect their lowered living standards.

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