

Changes in consumption behaviors of Polish seniors - singles in 2007 and 2016

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Abstract: The increase in the share of the number of older people in the Polish population requires constant diagnosis of the degree of satisfying their needs. One of the ways of such assessment is the dynamic analysis of changes in the goods and services consumption. The author's research task was to find an answer to the question whether according to subjective opinions of seniors in 2007, there were consumption restrictions caused primarily by the deterioration of their material situation and whether this situation deepened over the next 10 years. The aim of the article is to analyze the distribution of responses to this question in 2007 and 2016 based on the results of the GUS household budget surveys in single-person households (singles), where the situation may be particularly difficult. Two age groups were distinguished, differentiating the responses. The choice of years of observation was based on the occurrence of favorable assessments of the economic and social situations in these periods. One- and multi-dimensional tools of statistical analysis were used.

Keywords: seniors 60+, single-person households, consumption, expenses

JEL codes: D12, D14, D18, E21

1. Introduction

The population of Poland is subject to profound changes due to its age. The aging of the population is growing faster and faster. The diagnosis of reducing the consumption in households of elderly people is a part of the problems in social policy. It is particularly important to assess the phenomenon of limiting the consumption of goods and services of people aged 60+, living alone or creating so-called single-person households, colloquially referred to as singles. In the article, the aim of the author's deliberations was to assess the reduction of consumption in single seniors households in 2016 as compared to 2007. The problems of seniors' life appear in the second decade

of the XXI century as of utmost importance. The effects of social policy measures dedicated to seniors depend on the diagnosis of the state of satisfying the needs as a result of the consumption of goods and services, which in turn translates into the conditions, level, quality and dignity of older people's lives. Not fulfilling many needs simultaneously occurring in the final stage of life of older people violates the quality and dignity of their lives. *The 2015 Aging Report* has indicated Poland as one of the countries that will be the most affected by the aging of society. The ratio of unemployed people aged 65+ to the total number of employees will change in Poland from 33% in 2015 to more than 80% in 2060. This will be the highest increase within EU countries (Japonia: Demograficzne wyzwania kraju seniorów i „singli pasożytów”, 2018).

According to data of the Central Statistical Office (Informacja o sytuacji osób starszych na podstawie badań Głównego Urzędu Statystycznego, 2018), at the end of 2017, 9 million (24%) out of the 38.4 million of Poles were people aged 60 and more. Compared to 1989, the share of 60+ seniors increased by about 10 percentage points, with the highest increase being recorded for people aged 60-64 – they constitute almost 33% of all elderly people aged 60+. With the age, the share of women in the population of Poland is growing and this sex definitely prevails along with the transition to subsequent age groups. Particular attention should be paid to the fact that almost 28% of seniors are people over 80 (table 1). This creates particularly difficult task for social policy in the context of health care and building of various types of care homes.

Table 1. Share of older people in the total population of Poland, 2017, (in%)

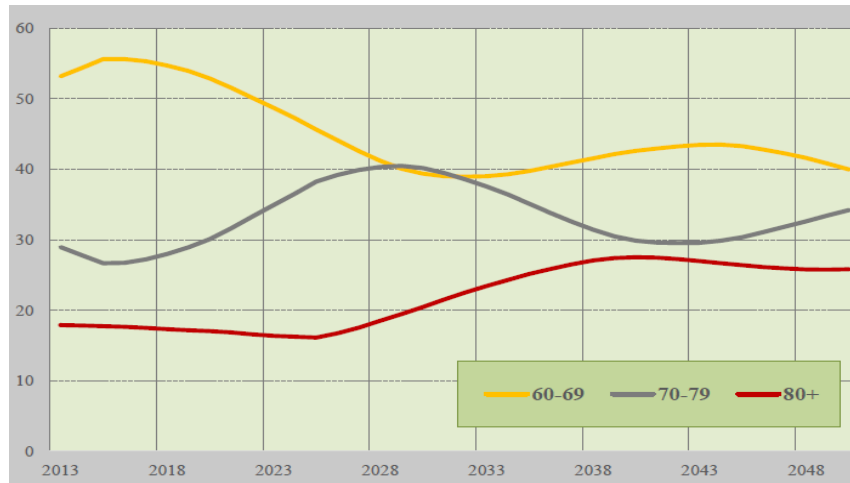
Population at the age of 60+	Total	Men	Women
	24,2	20,8	27,3
Age:			
60-64	29,8	33,6	27,2
65-69	25,3	27,1	24,0
70-74	15,5	15,6	15,4
75-79	11,7	10,6	12,5
80-84	9,4	7,6	10,7
85 and over	8,3	5,5	10,3

Source: own study based on: *Information on the situation of elderly people based on the research of the Central Statistical Office of September 28, 2018, table 1.1.1*

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In Poland, legal or fiscal regulations or low-interest loans systems for private investors are not functioning, however the government has increased interest in housing construction for the elderly people¹. The results of the CSO population forecast for 2014-2050 indicate that the population growth at the age of 60+ will be systematic one. Following the course of the graphic illustration in Figure 1, movement of subsequent years increases the number of seniors, especially in the 70-79 age group (up to 2030 year) and over 80 years in the third and fourth decade of the 21st century. This will be the effect of the demographic declines and demographic booms from the recent years, and in the years 2025 to 2045 the number of people in this subpopulation will grow significantly, and 65% of this group will be women.

Figure 1. Forecast of the structure of older people according to three age groups (in%)



Source: *Population aged 60+. Demographic and health structure*. GUS
page 10, figure 8

There are few research results in secondary sources dedicated to consumers living alone and their participation in the market, more often can be found works from the field of pedagogy or health economics. The authors of lifestyle studies most often deal with relatively young, educated populations with relatively high professional and financial status and living in big cities. An

¹ The author was member of the team which, at the request of the Ministry of Infrastructure and Construction, performed in 2017 a quantitative-qualitative study - *Expertise of housing needs of seniors and indication of significant problems and deficits in the area of senior housing*, 2017, Contractors: National Institute for Senior Management; Fundacja Laboratorium Architektury (LAB60+), PCG Polska Sp. z o.o; Amron Center. On the order of the Ministry of Infrastructure and Construction. Department of Housing, Warsaw.

example is the study *A metropolitan single* (Dąbrowska and Janoś-Kresło, 2011: 377-388), which in 2011 covered a group of people aged only 25-40 living in the cities of over 200,000 inhabitants. According to A.-L. Lai, M. Lim and M. Higgins, the single is "invisible" as a consumer (Lai et al., 2015: 1559-1583). Special attention in the context of social diagnosis, useful for politics should be paid to lonely seniors. The Central Statistical Office in the publication from September 2018 presents data on single-person households of older people on the basis of the 2011 Census, that is from almost 8 years ago.

A wider range of ages (18-65 years) included singles in the study entitled *The generation of singles* conducted by the portal Sympatia.pl and the University of Lodz in 2016². Singles, according to this survey, were people satisfied with their financial situation. 66% of respondents were satisfied with their financial situation, while 19% assessed their situation as bad one.

Research topics related to older singles, whose groups are heterogeneous, for example only due to their financial situation or health and their lifestyle, require comprehensive scientific cooperation. The first effects can be seen on the example of two interdisciplinary scientific studies: *Singlism. A new lifestyle in the post-modern world* (Kuklińska, 2013) and *Singlehood from individual and social perspective*. However, there is a lack of multidirectional research on the role of the single and its consumer behavior in the modern market.

How to prepare the market for lonely people, especially in old age to make the chances for them to choose, for example, according to the weight of food products or find information about, for example, tourism and cultural services. It is therefore an important research problem, few scientists explain these phenomena in the context of market functioning. Preparation of the infrastructure base requires constant monitoring of the expenses structure, which may be ensured by household budget surveys, however, the respondents in these empirical diagnoses constitute about 3% of households.

² *The generation of singles* survey was carried out by Grupa Onet RAS Polska and the University of Lodz, using the CAWI technique, on a sample of 2893 Polish internet users aged 18-65, by sending an invitation to users using websites and services of Grupa Onet RAS Polska, on 6 -30 September 2016. The sample structure was overweighted to reflect the demographic structure of Polish internet singles in terms of gender, age and education, based on Ombibus CAWI realized by ARC Rynek i Opinia on 4.11 - 14/11/2016, on the sample of n = 1008 netizens.

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1. One-dimensional analysis of the consumption behaviors of Polish 60+ seniors in 2007 and 2016.

To characterize the situation in the consumption of goods and services of Polish 60+ seniors in two years, and thus make an attempt to answer the question whether the level and structure of consumption, measured by the level of expenditure, changed within an interval of 10 years the results of household budget surveys conducted by the Central Statistical Office in 2007 and 2016 were used. The structure was examined in four basic spending objectives: food, dwelling using (water, electricity, gas, other energy sources, furnishing, household equipment and routine maintenance of the house), health and tourism. The observed variable was the subjective assessment of the material situation, conditioning expenditures on the consumption of goods and services, where this variable could characterize a possible limitation of needs satisfaction. The analysis was made on the basis of data from the widest, available source in Poland. The number of respondents in single-person households in 2007 amounted to 36,800 people, while in 2016 – 37,300. The share of people aged 60+ was 9.8% and 13.5%, respectively (table 2). The initial analysis of the number of respondents by gender and age prompted the author to distinguish two age groups in order to maintain the proportionality of the participation of seniors 60+ in the total sample.

Table 2. Characteristics of respondents based on gender and age (in years)

Features / age and gender distributions	2007	2016
Total 60+	N=3615	N= 4971
Age-age groups		
60-75	2451 (70%)	3392 (68%)
76+	1164 (30%)	1579 (32%)
Age-In total		
Measurements of the distributions structure (Luszniewicz and Słaby, 2008: 28-40):	72 years	72 years
Arithmetic average (years/person)	0,3	0,5
Asymmetry factor	68 years	67 years
60-75	-0,2	0,8
Arithmetic average		
Asymmetry factor	80 years	81 years
76+	1,2	0,8
Arithmetic average		

Asymmetry factor		
Sex - fractions (in %)		
60+		
Men	20% (706 persons)	0,8% (378 persons)
Women	80%	99,2%
60-75		
Men	20% (488 persons)	7,9% (267 persons)
Women	80%	92,1%
76+		
Men	19% (218 persons)	0,7% (111 persons)
Women	81%	99,3%

Source: own study based on data from the *Household budgets Surveys* of the CSO 2007 and 2016.

The data contained in Table 2 allow above all to notice that distributions in the total population due to two age groups in the distinguished years were almost identical, which is the basis for dynamic comparative analysis. Distributions due to age were characterized by low asymmetry, excluding people aged 76+. In this case, people in the age close to 76 were definitely prevailing in this subpopulation, but there were over a dozen or so people over 85 years old. The gender distributions indicated that both in 2007 and 2016 in the study group of seniors 60+, the representation of men was very low. Thus, the conclusions can in principle be a characteristic of consumption only in single-person households of women.

The results of the analysis of distributions of real disposable income and expenditures for the four identified objectives, which mainly absorb financial resources, are presented in Table 3 (in the source there is no data for people aged 80+).

Table 3. Basic characteristics of monthly distributions of real disposable income and total expenses / person and for four selected purposes; 2007; 2016

Descriptive statistics	2007/age			2016/age		
	60+*	60 -75	76+	60+	60 -75	76+
Disposable income						
Arithmetic average (PLN/person)						
Asymmetry factor	1115,92 2,7	1097,13 1,9	1144,9 2,5	1704,22 2,8 ↑(53%)	1707,29 2,8 ↑(55%)	1699,37 2,2 ↑(48%)
Total expenses (PLN)						

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Arithmetic average	1121,27**	1134,23	1099,5	1580,66	1619,60	1482,28
Asymmetry factor	2,2	2,3	2,8	2,6 ↑(41%)	2,4 ↑(43%)	3,1 ↑(35)%
Expenses for food						
Arithmetic average	317,01	325,01	300,16	402,34	414,06	377,16
Asymmetry factor	1,6	1,5	1,1	1,3 ↑(27%)	1,3 ↑(27%)	1,2 ↑(26%)
Expenses for dwelling using						
Arithmetic average	294,71	285,12	267,00	417,25	360,51	380,91
Asymmetry factor	3,2*****	3,4	1,1	2,8*** ↑(46%)	0,66 ↑(26%)	1,9 ↑(42%)
Expenses for health						
Arithmetic average	120,80	105,36	136,70	145,53	122,07	163,26
Asymmetry factor	2,16*****	2,2	2,00	3,3**** ↑(20%)	3,3 ↑(16%)	1,84 ↑(30%)
Expenses for recreation and culture						
Arithmetic average	55,22	60,68	49,7	87,67	89,09	63,91
Asymmetry factor	2,1	3,5	3,8	3,3***** ↑(58%)	4,7 ↑(46%)	4,25 ↑(28%)

* After removing 3 cases (income higher than PLN 9,000))

** After removing 6 cases (expenses higher than PLN 6,000)

*** After removing 16 cases (expenses higher than PLN 3,000)

**** After removing 11 cases (expenses higher than PLN 2,000)

***** After removing 7 cases (expenses higher than PLN 2,000)

***** After removing 6 cases (expenses higher than PLN 3,000)

Source: own study based on: *Information on the situation of older people based on surveys of the Central Statistical Office. 28/09/2018 table 1.1.1*

Table 3 contains two descriptive measures in unweighted terms, characterizing the diversification of income and expenditure distributions for selected purposes in selected subpopulations of seniors aged more than 60. The assessment of distribution asymmetry is of particular importance for correct interpretation. Footnotes under table 3 indicate that it was necessary to remove from a few to a dozen or so outliers. Without this measure, the asymmetry coefficient indicated respondents in subpopulations of seniors' respondents whose expenses were extremely high. The share of deleted cases was relatively small. Thanks to this operation, the

cognitive and diagnostics value of arithmetic mean increased, and it is a justification for using it as a characteristic of the distribution structure.

The disposal income available in average terms in 2016, both in relation to the group of 60+ respondents and in two distinguished groups, increased by about 50%. High asymmetry coefficients indicate that the majority of seniors in single-person households achieved relatively lower income. The relatively high income of a dozen or so 60+ people caused the overstating of the numerical value of asymmetry coefficient.

With regard to changes in expenditures in selected years, distant from each other by 10 years, one can see the relative identity of average spending on food in the group of 80+ senior citizens in total as well as in the distinguished age groups, although in 2016 there was an average increase of around 100 PLN / person, giving 27% increase against food expenses in 2007. Spending on dwelling usage increased by over 40% in the total group and among seniors 76+. Quite surprising was the relatively small increase in spending on health (about 20%), nevertheless it was much larger in the group of older seniors 76+. However, what can be explained by better health and lifestyle just after retirement at the age of 60, younger seniors spent much more on recreation and culture. Expenses for this purpose increased the most if compared to the other three consumption targets and in the entire 60+ group up it was 58%. This was favored by more and more often organized recreational activities, cheap tourist offers and cheaper tickets for cultural events dedicated to seniors. Summing up, the dynamic analysis of expenditures on the main purposes of consumption and services indicates the lack of grounds for stating that they could have occurred in terms of average limitations, lowering the quality and dignity of 60+ seniors' lives over a period of 10 years. Probably a more detailed analysis, eg in territorial terms or in the years of crisis, could verify this assessment in disadvantage.

2. Multidimensional analysis of 60+ seniors' consumption.

Undoubtedly, the group of 60+ seniors is strongly internally diversified, which prompted the author to conduct an in-depth analysis using the subjective type assessment of satisfaction of the needs of own household in the scope of four selected expenditure targets.

Indicators of the subjective type, which are characterized by a difficulty in the measurement process, reflect the feelings of people in relation to their lives (Gotowska, 2014: 33-43). The

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measurement is made on the basis of directly declared assessments and opinions of the respondent regarding the level of satisfaction that a person obtains from various spheres of functioning (Sompolska-Rzechuła, 2013: 19-36). Subjective ratings are most often recorded using the Likert scale. The analysis used binomial logistic regression as a method of analyzing data obtained from performed by CSO surveys of households' budgets in selected two-year periods. The dependent variable "Assessment of the level of satisfaction of the needs of your farm" had five variants. Subjective assessments of the degree of satisfaction of needs were therefore measured on a five-point scale. In the dichotomic model for the dependent variable, the value "one" meant the selection of the degree of satisfying the needs as very good and good, the value "zero" - the remaining cases. Determine variables were of quantitative nature (disposable income and expenses for four distinguished goals). Due to the fact that all explanatory variables were of quantitative nature, it was not necessary to perform the parameterization and determination of the so-called reference category.

A statistical tool, often used to assess the influence of independent variables on one dependent variable in the situation of subjective assessments, is a logistic type regression. Its application makes it possible to analyze the impact of several diagnostic features on a dichotomous type variable (Stanisz, 2007). Logistic regression model is increasingly used in economic sciences in the situation of subjective variables in the data set, e.g. this model was used in the study of social cohesion carried out by the Central Statistical Office (GUS, 2013) as well as in relation to marginalization and social exclusion of older people (Słaby, 2016a: 98-102; 2016b: 84-97).

Logit transformation consists in transforming the probability $P = P(Y = 1)$, which is expressed by the following formula:

$$\ln \frac{P(A)}{1-P(A)} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \quad (1)$$

The natural logarithm of an expression $\frac{P(A)}{1-P(A)}$ is called logit and takes the form of a linear function of explanatory variables X_1, X_2, \dots, X_k . Therefore, the selected parameter β_i is interpreted as the increase in the log value of the quotient caused by the increase of the selected exogenous variable by unit.

The implementation of logistic regression in the assessment of the level of satisfaction of the needs of 60+ seniors was preceded by a check whether the set of explanatory variables should

not be reduced. Both for the data from 2007 and 2016 in the three distinguished groups of respondents, i.e. for people aged 60+; 60 - 75 and 76+ Pearson correlation coefficients did not show the necessity of reduction. An example of a matrix of correlation coefficients for 60+ seniors in 2016 can be found in table 4.

Table 4. Numerical levels of Pearson's correlation coefficients*, group 60+; 2016.

Explanatory variables	Explanatory variables					
	Disposable income	Total expenses	Food	Household expenses	Health	Recreation and culture
Disposable income	1,00	0,55	0,25	0,26	0,17	0,29
Total expenses	0,55	1,00	0,42	0,58	0,33	0,46
Food	0,25	0,42	1,00	0,11	0,08	0,14
Household expenses	0,26	0,58	0,11	1,00	0,07	0,08
Health	0,17	0,33	0,08	0,07	1,00	0,9
Recreation and culture	0,29	0,46	0,14	0,08	0,9	1,00

* statistically significant at $\alpha = 0,05$

Source: own study using STATISTICA 13.1. Data from household budgets of the Central Statistical Office 2016.

Pearson's correlation coefficients, determined for the remaining subpopulations (total and for other age groups) were statistically not significant. The original set of diagnostic (explanatory) variables served as the basis for estimating the parameters of individual models using logistic regression. The article contains only the results of the analysis carried out for the group of 60+ seniors in 2016. In the first approach to building the model, the results of the estimation indicated that expenditure on food, health and recreation showed a statistically insignificant impact on the diversification of subjective assessments of the level of satisfaction of needs. In the second approach, the set of explanatory variables included disposable income, total expenditure, expenditure on dwelling using.

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Table 5. Results of logistic regression estimation for statistically significant variables

N=4888*	Constant	Disposable income	Total expenses	Household expenses
Assessment $\hat{\beta}_i$	-4,7031	0,0015	0,0004	-0,004
Standard error $S(\beta_i)$	0,1409	0,0001	0,0001	0,0002
t(4888) test	-33,3741	19,6795	6,0587	-2,9276
p	0,0000	0,0000	0,0000	0,0034
W – Wald Chi-square	1133,82	387,28	36,707	8,5706
p	0,0000	0,0000	0,0000	0,0034
Odds ratio $e^{\hat{\beta}_i}$	0,0091	1,0015	1,0004	0,9996

* after elimination of extreme cases from the original set N = 4971

Legend: W_W – constant, $\hat{\beta}_i$ - value of the structural parameter, $S(\beta_i)$ - standard error of estimation, p - critical level of significance, W - value of Wald's statistics, $e^{\hat{\beta}_i}$ - odds ratio. R^2 is not given because the model is not hierarchical.

Source: own study with the use of STATISTICA 13 based on data from household budget surveys of the Central Statistical Office 2016.

In the analysis of the obtained results, particular attention is paid to the interpretation of the odds ratio, which may take values from the scope of three variants. Since the explanatory variables in the logistic regression model being built were quantitative, the interpretation is identical to the multiple regression model (the constant is not interpreted). And so, if the disposable income increases by a unit (PLN / person), the probability of feeling a positive assessment of the level of satisfaction of needs increased in 2016 in the group of 60+ senior citizens by 0.15% in total. With an increase in total expenditure by 1 PLN per person, the probability of a positive assessment increased by 0.04%, while an increase in expenditure on housing consumption caused a decrease in the probability of a positive assessment by 0.04%. The results oscillated around unity at explanatory variables, which were statistically significant, which meant that it was difficult to establish a ranking and separate expenditures positively shaping the diversity of positive assessments of the level of satisfaction with fulfilling the needs of 60+ seniors in 2016.

To make a comparison over the time, the odds ratio was estimated using the logistic regression model for 2007 and 2016. The results are presented in Table 6.

Table 6. Odds of chances of satisfaction with fulfilling the needs through consumption, assessed by the level of expenditure in 2007 and 2016

Expenditure goals	2007			2016		
	60+	60-75	76+	60+	60-75	76+
Disposable income	1,0018	1,0019	1,0016	1,0015	1,0014	1,0017
Total expenses	1,0010	1,0007	1,0015	1,0004	1,0006	1,0004
Food	0,9978	0,9983	0,9976	*	*	*
Household expenses	0,9987	0,9988	0,9984	0,9996	0,9996	0,9992
Health	0,9983	0,9984	0,9973	* 0,9900**	0,9991	* 0,9991**
Recreation and culture	0,9988	*	*	*	*	*

* not statistically significant at $\alpha = 0,05$; ** statistically significant $\alpha = 0,10$

Source: own study with the use of STATISTICA 13 based on data from household budget surveys of the Central Statistical Office 2016.

Both in 2007 and in 2016, the increase in incomes and expenses enhanced the probability of positive assessments, with a relatively higher such probability in the group of single-seniors aged 60-75 in 2007. The increase in expenditure on food, housing, health was negative and was larger in 2007. It may, therefore, mean that the increase in spending for these purposes in 2007 had a greater negative impact on the level of satisfaction with fulfilling the needs. While using these results, it can be seen with some caution that higher revenues and expenses in 2016 conditioned stronger positive satisfaction assessments, although the probability of the impact of distinguished variables (income and expenses) was low.

Conclusions

Summing up, in the light of secondary character research, it can be said that singles, and in particular seniors are a market segment that attracts more and more interest from researchers in various disciplines. So far conducted studies refer to the few, most often unrepresentative groups

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in specific age categories, usually residents of (large) cities. Therefore, the results should be considered as fragmentary, which may serve in social policy and economic practice for more decisive and desirable actions.

The changing demographic structure of the population, not only in Poland, but also in many countries, is becoming a key problem, it is necessary to diagnose the living conditions of seniors, in particular income and expenditure on basic goals. The aging process of the Polish population, resulting from various reasons and expressed by the continuous increase in the share of older people in the population is a huge challenge for the economy and society. State statistics provide annually data on the living conditions of the population. However, despite the increasing number of seniors, their representation in CSO surveys is relatively not increasing.

The presented results of the analysis refer almost exclusively to female seniors aged 60+, and the examination of the determinants of the level of satisfying the needs does not allow to conclude that consumption has a decisive impact on the feeling of positive states of satisfaction. The difference in the assessment of the situation at the interval of 10 years indicates a minimal improvement in satisfaction with satisfying the needs of female seniors. Discernment of what is happening in the subpopulation of male seniors aged 60+ requires increased methodological effort of the Central Statistical Office regarding their participation in household budgets surveys.

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Zmiany konsumpcji polskich seniorów - singli w latach 2007 oraz 2016

Streszczenie

Wzrost udziału liczby osób starszych w ludności Polski wymaga ciągłych diagnoz stopnia zaspokajania ich potrzeb. Jedną z dróg takiej oceny jest analiza dynamiczna zmian konsumpcji dóbr i usług. Zadaniem badawczym autorki było poszukiwanie odpowiedzi na pytanie czy według subiektywnych opinii seniorów w 2007 roku wystąpiły ograniczenia konsumpcji wywołane przede wszystkim pogorszeniem sytuacji materialnej oraz czy ta sytuacja pogłębiła się w ciągu następnych 10 lat. Celem artykułu jest analiza rozkładów odpowiedzi na to pytanie w roku 2007 i 2016 na podstawie wyników badań budżetów domowych GUS w gospodarstwach jednoosobowych (singli), w których sytuacja może być szczególnie trudna. Wyróżniono dwie grupy wiekowe, różnicujące odpowiedzi. Wybór lat obserwacji oparty był na występowaniu korzystnych ocen sytuacji gospodarczo-społecznych w tych okresach. Zastosowano jedno- i wielowymiarowe narzędzia analizy statystycznej.

Słowa kluczowe: seniorzy 60+, gospodarstwa jednoosobowe, konsumpcja, wydatki