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Changes in the standard of living of chosen countries that joined the European Union after 2004

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Abstract: The article is devoted to the issue of changes in standard of living, which were noted in the Member States that joined the EU structures after 2004. An attempt was made to capture the impact of EU policies on the level of living standards in the Member States. The time taken in the study covers the years 2004-2014. The year of the largest enlargement in EU history was adopted as the beginning of the period. The study used taxonomic methods, in particular the Hellwig development index.

Keywords: taxonomic methods, cohesion policy, standard of living, European Union

JEL codes: C15, D63, E21

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1. Introduction

The problem of equalizing the standard of living on an equal basis with other disproportions in the level of development of the Member States, is an important component of the European Union's policy. If the European Union is to achieve the assumed level of integration, it is also necessary to achieve the most even level of development of the Member States. Specific level of development equalization is a prerequisite for fairly equal (recognized as fair) participation in the benefits of European integration. In this context, economic, political and social cohesion constitute a basic guarantee for the stability and sustainability of EU structures. For obvious reasons in the process of shaping EU policy, the

dominant importance is attributed to political and economic goals. Nevertheless, the broadly understood social issue is not without meaning, but on the contrary is an equally important component. It should be remembered that the political and economic efficiency of the EU is insufficient for progressing, ever deeper, European integration. It is crucial to maintain a sufficiently high level of social acceptance expressed for the first time at the time of accession of a given country to the EU. Only then will its further development be guaranteed and any negligence in this respect will lead to a slow destabilization of the EU.

The article is an attempt to show changes in the standard of living in relation to countries that joined the European Union in 2004. Date 1 May 2004 is a special moment in the functioning of the EU, in this year the largest EU enlargement of its structures took place, which included the membership of 10 new countries. The new Member States differed considerably in the level of socio-economic development, especially in comparison with the countries already functioning within the EU (the so-called "Old Member State"). This meant that the actions taken to increase broadly understood cohesion must be significantly expanded and supplemented with new mechanisms that would allow a relative leveling of development levels across the EU. These activities also concerned the level and quality of life of the societies of the new Member States, and this is the element of EU policy to be described..

2. The standard of living – the theoretical approach

In the theory and practice of social research the standard of living is widely recognized as one of the basic determinants of the conditions of human existence and the level of social development of the population (Berkka, 1999: 67). The quality of this existence is described, in the most general terms, by the degree of satisfaction of the needs reported by members of a particular community: households, social groups or population (Piasny, 1993: 73). Numerous definitions of the standard of living can be found in the already rich literature of the subject. The reason of that is because ultimately this category has not been clearly defined. Attempts to harmonize its material scope have ended in failure, for it has not been possible to work out a unified definition that would be approved by all researchers in this field (Kalinowski, 2015: 13). The great difficulty in defining the standard of living results from the high complexity of this concept and the fact that it is of interest to representatives of various fields of science. The inter-disciplinary nature of this category causes that different theoretical and methodological approaches are applied. As a consequence of such a large variation in approaches to describing and explaining this research category over the years, significant

difficulties of interpretation have emerged, the occurrence of which is associated with a fairly common inconsistency in the terminology used by individual researchers.

The standard of living is not the only category referring to the broadly understood living conditions of the population. In the context of this subject, concepts such as the quality of life, life standard, lifestyle, living conditions, wealth and social well-being are also mentioned (Bywalec, 1991: 194). Similarly to the level of living, these categories have not been clearly defined, and only in relation to some concepts we have managed to develop relatively stable definitions. In the literature, these categories are usually regarded as synonymous or related categories to the level of living, and some authors even consider them to be identical (Berbeka, 1999: 67). A wider discussion about them is available in the subject literature.

Among many definitions of the standard of living, the proposal of the United Nations Organization Committee of Experts from 1954 deserves a special distinction. It was one of the first comprehensive definition of this research category, and also the starting point for many subsequent definitional solutions. According to the concept of UN experts, the level of life is understood as "the overall real living conditions of the population and the degree of satisfaction of material and cultural needs, through a stream of goods and services paid for, and also from social funds" (United Nations, 1954 cited in Piasny, 1993: 73). Such defined level of living includes both material (measurable) and intangible (hard to measure) aspects of the living conditions of the population, and thus refers not only to the actual living conditions of the population but also to a specific minimum and standard of living (Kalinowski, 2015: 14).

J. Drewnowski, one of the co-authors of the concept presented in the UN framework, had a particularly significant contribution to the development of research on the standard of living. In his subsequent works, he presented the standard of living in a slightly modified approach, as "[...] the level of satisfaction of needs in a unit of time, as a result of goods, services and living conditions enjoyed by the population in this unit of time" (Drewnowski and Scot, 1966). Drewnowski's research, and especially the method of measuring the standard of living proposed by him, contributed to a significant increase in interest in the issues of measuring the living conditions of the population.

In the Polish literature, the first definition of the standard of living appeared thanks to A. Luszniwicz. He made a special adaptation of the original UN proposal and Drewnowski's approach to Polish conditions. According to Luszniwicz, the standard of living is defined as "[...] the degree of satisfying the material and cultural needs of society through a stream of

goods and services paid for and through a collective consumption fund in a given unit of time and space" (Luszniewicz, 1982: 13). This definition underlines the material nature of needs, the satisfaction of which describes the standard of living of the population. Such an approach to defining the level of life has gained many supporters, which include T. Słaby and J. Rutkowski. Differences in Drewnowski's and Luszniewicz's approaches to grouping the needs that show the standard of living are presented in Table 1.

Table 1. Areas of life in relation to satisfying the basic needs of society according to the approach proposed by J. Drewnowski and A. Luszniewicz.

J. Drewnowski	A. Luszniewicz
<ol style="list-style-type: none"> 1. Alimentation 2. Cloth 3. Inhabitancy 4. Health 5. Education 6. Rest 7. Security 8. Social Environment 9. Physical Environment 	<ol style="list-style-type: none"> 1. Alimentation 2. Cover (Flat, Clothing, Footwear) 3. Healthcare 4. Education 5. Recreation 6. Security 7. Social 8. Material Development

Source: own elaboration based Zienkowski, 1979: 99, Luszniewicz, 1978: 17.

Z. Żekoński presented a different approach to defining the standard of living, pointing to the infrastructural character of this research category. In this approach, the standard of living means "[...] all the conditions in which society lives, socio-occupational group, household or unit, expressing above all in the comforts of the process of satisfying individual and collective needs in the conditions in which consumer behavior occurs, in ecological conditions, in working conditions, in free time conditions, in some aspects of the organization of social life, for example personal security" (Żekoński, 1974: 357 cited in Majka, 2015: 39).

J. Fourastié, the standard of living refers directly to the act of consumption, stating that "it is the amount of goods and services that everyone consumes" (Fourastié, 1962: 15 cited in Gotowska, 2014: 18). A similar position to this approach was presented by Cz. Bywalec who defines the standard of living as "[...] the level of satisfaction of human needs resulting from

the consumption of material goods and services" (Bywalec, 1986: 36). Later, Bywalec together with S. Wydmus modified this definition by the aspect related to the use of natural and social values (Bywalec and Wydmus, 1992 cited in Pawełek, 2004: 15). From the point of view of the practical use of particular definitions in the framework of the conducted research, the proposition of Bywalec and Wydmus is the most commonly cited definition of the standard of living.

At the EU level, the standard of living also does not have a unified definition. It was decided to rely on the already existing achievements of researchers from individual Member States. Instead of creating a new definition solution, which would be difficult to implement due to described specificity of this category.

2. Study of changes in the standard of living

In the case of testing the standard of living, there is a considerable difficulty in measuring the actual satisfaction of the needs of members of a given population. For this reason, it has been accepted in research practice that the assessment of standard of living should be carried out not on the basis of surveys (it would allow to know individual satisfaction), but on the basis of the assessment of the ability to satisfy a set of needs adopted in the study of living standards. Thus, it is not necessary to actually satisfy a particular need (it does not have to be reported during the measurement), but the existence of an objective possibility to meet such needs will be considered sufficient.

The study of changes in the standard of living of countries that joined the European Union after 2004 will take place in four stages:

1. Selection of quantitative variables related to the standard of living;
2. Selection of representatives of individual variables on the basis of their variability and lack of autocorrelated phenomenon between names;
3. Determination of the impact of selected variables on the level of life, in the case of a positive impact, the variable is defined as stimulant, and with the negative impact the variable is defined as destimulants;
4. Conducting an appropriate study of changes in the level of living using the Hellwig standard development method.

Changes in the level of living in the EU Member States will be verified on the basis of the value of a synthetic measure of living standards. During the construction of this measure, it turned out that data from Eurostat for some countries (Bulgaria and Romania and Croatia)

were unavailable for the study period (2005-2012) adopted in the study. As the accession of these countries took place later, it is impossible to obtain a reliable indicator for the adopted study period. For this reason, these countries have been eliminated from the study.

The set of 14 variables initially accepted for the study was finally limited to 10 variables. On the basis of values of coefficients of variation and correlation, quasi-constant variables and those for which they were strongly correlated with other variables accepted for the study were eliminated. The final set of variables accepted for the study is presented in Table 2.

Table 2. Variables accepted for the study of changes in the standard of living

Symbol	Variable	Influence
x_1	Expenditure on social protection (% GDP)	Stimulant
x_2	Curative care beds in hospitals per 100 000 inhabitants	Stimulant
x_3	Long-term unemployment rate, % of active population aged 15-74 (percentage of active population)	Destimulant
x_4	Overcrowding rate (%)	Destimulant
x_5	CO ₂ emissions per inhabitant in the EU and in developing countries	Destimulant
x_6	Young people neither in employment nor in education and training (15-24 years) – % of the total population in the same age group	Destimulant
x_7	Real GDP per capita	Stimulant
x_8	Share of total population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames of floor	Destimulant
x_9	Level of internet access (percentage of households who have internet access at home)	Stimulant
x_{10}	Greenhouse gas emissions – tonnes per capita	Destimulant

Source: own elaboration.

The selected set of variables was then used to determine the measure of Hellwig's development. In general terms, this method consists in calculating the distance of the tested object from the determined pattern. In a situation where a reduction in the distance is observed it means an improvement of the situation, while an improvement of the situation deteriorates. The determination of Hellwig's pre-determined measure precedes the standardization of source data and the determination of the distance from the standard using the Euclidean metric. Standardization is based on the following formula:

$$z_{ij} = \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}} \quad i = 1, 2, \dots, n \quad j = 1, 2, \dots, m$$

Determining the coordinates of the pattern is based on the following formula:

$$z_{0j} = \begin{cases} \min\{z_{ij}\} \text{ for } D \\ \max\{z_{ij}\} \text{ for } S \end{cases} \quad i = 1, 2, \dots, n \quad j = 1, 2, \dots, m$$

where: **D** – destimulant; **S** – stimulant.

Determining the measure of development (m_i) is based on the following formula:

$$m_i = 1 - \frac{d_{i0}}{d_0} \quad i = 1, 2, \dots, n$$

where: d_{i0} – Square of the Euclidean distance of the variable from the pattern; d_0 – critical value.

The variables used in the formula should be designated as follows:

$$d_{i0} = \sqrt{\sum_{j=1}^m (z_{ij} - z_{0j})^2} \quad d_0 = \overline{d_{i0}} + 2S(d_{i0})$$

where: $\overline{d_{i0}}$ – the arithmetic mean of the calculated Euclidean distances; $S(d_{i0})$ – standard deviation from the calculated Euclidean distances

$$\overline{d_{i0}} = \frac{1}{n} \sum_{j=1}^n d_{i0} \quad S(d_{i0}) = \sqrt{\frac{1}{n} \sum_{j=1}^n (d_{i0} - \overline{d_{i0}})^2}$$

After determining a synthetic measure of living standards on the basis of variables accepted for the study, they should be grouped (classified). The class intervals will be determined on the basis of the arithmetic average and standard deviation. The set of studied objects will be divided into four classes: I – high standard of living, II – average level of life, III – moderate standard of living, IV – low standard of living. Class intervals will be determined based on the following formulas:

high standard of living	$m_i \geq \overline{m}_i + S(m_i)$
average level of life	$\overline{m}_i + S(m_i) > m_i \geq \overline{m}_i$
moderate standard of living	$\overline{m}_i > m_i \geq \overline{m}_i - S(m_i)$
low standard of living	$\overline{m}_i - S(m_i) > m_i$

In the conducted study, the pattern for the development measure was determined based on observations from all years of the adopted research period. With such estimated pattern it

possible to observe changes in the standard of living in all the years accepted for the study, while maintaining the comparability of the results obtained. The values of Hellwig's development measure describing the diversity of the standard of living observed in 25 EU member states are presented in Table 3.

Table 3. Values of Hellwig's development measures for 25 EU Member States in 2005-2013.

Country	2005	Country	2006	Country	2007	Country	2008	Country	2009	Country	2010	Country	2011	Country	2012
DN	0,412	DN	0,431	DN	0,435	DN	0,438	DN	0,419	NL	0,380	NL	0,378	NL	0,341
FI	0,340	NL	0,351	FI	0,366	FI	0,374	NL	0,402	DN	0,370	FI	0,338	FI	0,337
NL	0,309	FI	0,350	NL	0,395	NL	0,393	FI	0,350	FI	0,339	BE	0,323	BE	0,331
BE	0,298	BE	0,313	SE	0,397	AT	0,305	BE	0,317	BE	0,303	DN	0,300	AT	0,309
SE	0,295	SE	0,298	AT	0,329	BE	0,315	SE	0,294	AT	0,298	AT	0,299	DE	0,288
UK	0,292	AT	0,292	BE	0,325	CY	0,258	AT	0,280	SE	0,283	SE	0,278	DN	0,286
AT	0,292	UK	0,280	CY	0,269	FR	0,280	LU	0,273	LU	0,272	DE	0,276	SE	0,278
FR	0,274	FR	0,279	FR	0,317	DE	0,254	CY	0,266	DE	0,265	FR	0,273	FR	0,263
LU	0,274	LU	0,260	DE	0,265	IE	0,253	FR	0,265	FR	0,262	LU	0,268	LU	0,256
IE	0,253	CY	0,249	IE	0,257	LU	0,255	DE	0,252	IE	0,237	IE	0,246	IE	0,226
DE	0,230	IE	0,246	LU	0,319	MT	0,232	IE	0,245	UK	0,212	UK	0,203	UK	0,200
CY	0,198	DE	0,226	UK	0,273	SE	0,316	UK	0,231	CY	0,208	CZK	0,194	CZK	0,195
MT	0,193	MT	0,210	CZK	0,191	UK	0,249	MT	0,206	CZK	0,201	MT	0,188	MT	0,184
SI	0,143	SI	0,151	GR	0,168	CZK	0,209	CZK	0,204	MT	0,188	SI	0,186	SI	0,172
ES	0,128	GR	0,147	HU	0,165	EE	0,174	SI	0,191	SI	0,183	CY	0,186	CY	0,165
IT	0,125	ES	0,146	IT	0,165	GR	0,176	GR	0,176	SK	0,165	SK	0,151	LT	0,157
GR	0,125	CZK	0,139	LV	0,171	IT	0,141	SK	0,169	GR	0,152	LT	0,146	SK	0,130
PT	0,124	IT	0,132	LT	0,204	LT	0,171	LT	0,149	LT	0,133	GR	0,134	EE	0,123
SK	0,117	PT	0,124	MT	0,211	SI	0,195	EE	0,137	IT	0,128	EE	0,126	GR	0,119
CZK	0,116	HU	0,124	PT	0,168	ES	0,158	IT	0,133	EE	0,125	IT	0,115	ES	0,116
HU	0,113	EE	0,123	SK	0,168	HU	0,109	ES	0,127	PT	0,116	PT	0,115	IT	0,111
EE	0,099	SK	0,121	SI	0,208	LV	0,113	PL	0,116	ES	0,116	ES	0,110	PL	0,102
LT	0,091	LT	0,114	ES	0,181	PL	0,111	PT	0,116	PL	0,115	PL	0,105	PT	0,099
LV	0,065	LV	0,088	EE	0,139	PT	0,132	HU	0,115	HU	0,087	HU	0,083	HU	0,089
PL	0,052	PL	0,056	PL	0,110	SK	0,138	LV	0,077	LV	0,053	LV	0,042	LV	0,055

Source: own elaboration based Eurostat data

Based on the results, it can be seen that the countries that joined the EU in 2004 were mostly in the lower two class compartments designated for the standard of living. Thus, their standard of living can be described as moderate or low. In fact, in the whole period of the study, the indicators regarding the standard of living for these countries have gradually improved, with the pace of this improvement being different for different countries. Table 4 presents the distance between Member States that joined the EU after 2004 and the Member State with the highest value of a synthetic measure of the standards of living.

Table 4. Distance between Member States that joined the EU after 2004 and the Member State with the highest value of a synthetic measure of the standards of living.

Coun.	2005	Coun.	2006	Coun.	2007	Coun.	2008	Coun.	2009	Coun.	2010	Coun.	2011	Coun.	2012
CY	0,215	CY	0,182	CY	0,166	CY	0,18	CY	0,153	CY	0,171	CZ	0,184	CZ	0,146
MT	0,219	MT	0,221	MT	0,224	MT	0,207	MT	0,212	CZ	0,179	MT	0,19	MT	0,157
SI	0,27	SI	0,28	SI	0,227	CZ	0,229	CZ	0,215	MT	0,191	CY	0,192	SI	0,169
CZ	0,296	CZ	0,292	LT	0,232	SI	0,243	SI	0,228	SI	0,197	SI	0,192	CY	0,175
SK	0,296	HU	0,307	CZ	0,245	EE	0,264	SK	0,25	SK	0,215	SK	0,227	LT	0,184
HU	0,299	EE	0,308	LV	0,264	LT	0,267	LT	0,269	LT	0,246	LT	0,231	SK	0,211
EE	0,313	SK	0,31	SK	0,268	SK	0,301	EE	0,282	EE	0,254	EE	0,251	EE	0,218
LT	0,321	LT	0,317	HU	0,27	LV	0,325	PL	0,303	PL	0,265	PL	0,272	PL	0,238
LV	0,348	LV	0,343	EE	0,296	PL	0,327	HU	0,304	HU	0,293	HU	0,294	HU	0,252
PL	0,361	PL	0,375	PL	0,325	HU	0,33	LV	0,342	LV	0,327	LV	0,336	LV	0,286

Source: own elaboration based Eurostat data.

The highest rate of improvement in the indicator of living standards can be observed for the Czech Republic, which in 2012 was in the position of the leader of the class compartment described as a moderate standard of living.¹ The observed situation coincides with earlier results of research (Bobrowska and Musiał, 2016). In general, the higher rates of distance reduction to the Member States' leader were noted by those countries which were at the start point of period study in the third class.

A special moment of the analyzed period is the year 2008, where the indicators of living standards for the majority of the analyzed Member States were dropped. The reasons for this decline should be seen in the consequence of the financial crisis that took place in 2008. As a result of a series of negative impulses, most of the world's economies recorded a deterioration of economic indicators. The unfavorable change in the economic situation was transferred into a temporary deterioration in the indicators of the standard of living. Then, starting from 2009, gradual improvement of the synthetic life-quality meter has started again.

The study of differences in the standard of living of newly admitted EU member states should also be supplemented with information on the stratification of household income. Indeed, the income stratification is an important premise indicating the level of inequality between individual Member States. For this purpose, the values of the Gini coefficient will be presented, which is one of the basic and commonly used measures describing the stratification of household incomes in the surveyed population. The Gini coefficient assumes values from the interval [0; 1], where the value 0 means an even distribution of income, while if its value approaches 1, it means that the distribution of income is completely uneven. The higher values of this coefficient indicate a high concentration of income, and hence their large diversity within the studied population. The values of the Gini coefficient for Member States that joined the EU after 2004 are presented in Table 5.

Table 5. The value of the Gini coefficient in 2005-2015, for the Member States that joined the EU after 2004.

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Change 2005/2015
CY	30,3	31,1	31,1	31,7	32,1	31,5	32,6	34,3	37,0	35,6	34,0	3,7
CZ	26,9	26,7	26	26,3	26,2	26,6	26,4	26,1	26,5	25,9	25,9	-1,0
EE	33,4	33,7	31,2	31,9	31,4	32,0	32,5	32,9	35,1	34,6	32,7	-0,7
HU	34,7	28,3	27,9	27,5	27,0	29,4	29,2	30,8	31,5	30,9	30,4	-4,3
LT	35,3	34,4	34,8	35,7	37,2	33,6	32,5	35,1	35,3	37,7	37,4	2,1
LV	39,0	35,6	37,5	37,2	35,9	35,0	35,8	35,2	35,5	35,1	34,2	4,8
MT	—	28,0	29,2	29,0	30,2	29,0	29,1	29,4	28,8	29,0	29,4	1,4*
PL	34,5	33,7	33,5	33,7	33,6	33,2	32,8	32,4	32,5	32,1	31,8	-2,7
SI	24,6	24,4	24,4	23,7	24,8	24,9	24,9	25,6	26,2	25,7	25,4	0,8
SK	29,3	25,8	24,7	26,0	27,2	27,3	26,5	26,1	28,1	26,1	26,5	-2,8

* due to the lack of data, the change was calculated for 2006/2015

Source: own elaboration based World Bank data.

Also in the case of income inequality data in the new EU Member States, there is a real improvement. In relation to most of the Member States, the Gini coefficient decreased in value compared to 2005. The largest fall in the value of this indicator was recorded by three countries, ie Hungary, Slovakia and Poland. In contrast, in the case of some countries, the stratification of household income increased compared to the first year after accession to the EU. The group of these countries includes Latvia, Cyprus and Lithuania. here was a higher concentration of income, despite positive changes in the standard of living measured using the

synthetic Hellwig measure. Such a situation may indicate that the positive impulses resulting from the accession to the EU are not evenly spread.

3. Conclusions

On the basis of the conducted research, it can be concluded that the situation of the states that joined the European Union in 2004 in the context of the standard of living has significantly improved. It is obvious that the pace of this improvement depends not only on financial assistance obtained from EU funds, but also on the size of a given state, the socio-economic situation at the time of accession and the efficiency and effectiveness of national policy. Nevertheless, apart from other issues, it should be noted that the assessment of the rightness of the decision on the accession of these countries to the EU may be positive.

The conducted research also indicated that changes in the standard of living, including in the negative direction, can be observed in the Member States that created the so-called "Old 15". Nevertheless, with few exceptions, the values of the synthetic measure of living standards for these countries rank in the first two class intervals. This situation shows that the division between the so-called "Old EU" and new EU members has still not been completely obliterated. However, the observed positive rate of change indicates that the distance between these countries is gradually decreasing.

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Zmiany poziomu życia wybranych państw członkowskich, które przystąpiły do Unii Europejskiej po 2004 roku

Streszczenie

W artykule poruszona została problematyka zmian poziomu życia w państwach członkowskich Unii Europejskiej, które przystąpiły do struktur unijnych po 2004 r. Podjęta została próba uchwycenia oddziaływania polityki UE na wyrównywanie poziomu życia w państwach członkowskich. Przyjęty w badaniu okres obejmuje lata 2004-2015. Za początek okresu badawczego przyjęty został rok 2004, ze względu na fakt, że w tym właśnie roku nastąpiło największe w historii UE rozszerzenie jej struktur. W badaniu wykorzystano metody taksonomiczne, w szczególności wskaźnik rozwoju Hellwiga jako syntetyczny miernik poziomu życia.

Słowa kluczowe: metody taksonomiczne, polityka spójności, poziom życia, Unia Europejska