ANALYSIS OF CHANGES IN LIFE QUALITY INDICATORS FOR COUNTRIES INDUCTED TO THE EUROPEAN UNION CLASS OF 2004

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Abstract:
The article presents the ranking of countries inducted to the European Union class of 2004, covering the idea of the quality of life, created with the usage of data accessible in European statistics. The ranking was created with the usage of the taxonomic method that allowed to prepare a synthetic measure that enabled the comparison of different absolute data. Tested entities were countries joined European Union in 2004. Authors analyse changes in the level of the quality of life seven years after the accession. It allows to check if and how the participation in the European Union structures affects the quality of life in countries with similar background when accessing to the EU. The synthetic indicator created by authors was based on such aspects as: economic and physical safety, education, health, material and living conditions, natural and living environment and productive or main activity. It was then compared to the other indicator that is said to describe the quality of life – HDI. The comparison reveals that analysing the quality of life is a difficult and comprehensive process requiring a broad look at variables and the analysed idea itself. The paper may also be treated as a guidepost showing areas which need improvement as far as the quality of life is concerned. A place in the ranking represents how many areas require changes and in which spheres they should be implemented. Nevertheless, constant improvement of the quality of life is the key to increase the widely understood welfare of societies.

Keywords: synthetic indicator of quality of life, ranking of changes in quality of life, human capital, knowledge and learning society, comparison between the created synthetic indicator and the HDI

1. INTRODUCTION

Social welfare is a very often undertaken theme under the social science which Economics is. The quality of life as a category is hard to measure because of its subjectivity especially when it comes to the standpoint of various social groups. This category should be quantified to be able to present results of researches in legible, systematized and especially universal way. Unfortunately, there is none commonly accepted indicator that would cover many various aspects describing the concept of the quality of life to be said to be a reliable one. It is known, however, that researches covering the topic of the quality of life are conducted for a long time by many different people and institutions interested in this area of analyses but yet it causes problems when it comes to the choice of significant methodology.

This article presents the comparative analysis of indicators which determine the quality of life in countries inducted to the European Union class of 2004. In 2004 such countries as Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia joined the European Union. This extension has a historical meaning because it was the first time so many countries had taken part in. It is known for ending the long process that let the Europe be reunited once again after being under the Iron Curtain and the Cold War for over a half of the century. The moment of the accession is the starting point of the analysis. The research covered seven years after this moment. Such period of time allows to evaluate noticeable results of reforms and investments that have been conducted.

The analysis was based on public statistical data. Indicators presented in this article belong to various economic and social spheres. However data published by Eurostat were fundamental for this research. Significant determinant of the quality of life can be presented as follows: material living conditions, productive or main activity, health, education, economic and physical safety and natural living environment. These six groups will make the comparison scheme, that will allow to create a ranking. Eurostat elaborated those groups of indicators mentioned beyond but did not make a synthetic indicator that will provide the opportunity to analyse changes in the quality of life of citizens of countries inducted to the European Union class of 2004.

The purpose of this article is to show how the accession to the European Union affected changes in the quality of life in mentioned countries. It is commonly known that instruments available after the accession have an influence on economy and politics of the country. It brings the immense potential in increasing the quality of life of citizens but to be able to do this, it has to be used properly. The comparison analysis shows how the European Union membership provides opportunities to develop the quality of life in countries that had very similar history and economy in recent years. Moreover, authors try to check the link between the quality of life and knowledge society, learning and human capital through the analysis of the influence of the educational aspect on the change of the quality of life and economic growth. Nevertheless, knowledge and learning factors are the most important as far as the human capital and its improvement are concerned and thus allow for continuous economic and social development.

2. THE ACCESSION PROCCESS AND AID INSTRUMENTS IT GIVES INFLUENCING THE IMPROVEMENT IN THE QUALITY OF LIFE

The history of the European Union begins in 1957 when six European countries namely Belgium, France, Germany, Italy, Luxembourg and the Netherlands. They met 25th day of March in Rome to sign the treaty creating European Union. The Union was not exclusive. There were predictions of the possibility to expand with new European countries since the very beginning.

Requirements concerning the possibility to join European Union were specifically refined over time. Each and every country that respects the right of freedom may apply for the membership in European Union. Moreover, such country has to meet certain criteria[1]:

- political criteria: stable democratic institutions, rules of law, respect for human rights and respect and protection of minorities;

[1] *Zrozumieć rozszerzenie. Polityka rozszerzenia Unii Europejskiej* (2007), p. 6. Retrieved from http://ec.europa.eu/enlargement/pdf/publication/enl-understand_pl.pdf

- economic criteria: well-organized free market economy and the ability to face competition and European Union's market forces;
- the ability to face requirements of the membership that include adherence to a political, economic and monetary Union;
- facing the whole union acquis and assure its efficient implementation by appropriate administrative and judicial structures period.

Both candidates for joining the European Union and countries already taking part in EU may gain benefits due to well-organized process of the accession. Candidates have to show that they are fully prepared to fulfil every member-to-be obligation. It would not be possible without the proper adjustment to EU standards in their systems. Moreover, total acceptance from the society is needed and very important. Obviously, there are comprehensive acceptance procedures on each stage of the accession process. The negotiations are said to be officially opened when European Commission grants the positive opinion about possibilities of the fulfilment requirements by the candidate and when European Council grants unanimously the negotiating mandate.

Negotiations are conducted individually for each country. Their rhythm depends on the progress made by the candidate. Countries that are trying to get the membership in the European Union are generally motivated to carry out quick and effective reforms. Some of them require significant transformations in their political and economic structure. This is greatly connected to necessity of providing crystal clear information about reasons behind implementing changes to the society. The support of citizens is the key to achieve success in accession process.

The acquis of the European Union is divided into areas corresponding to each domain of the union policy. The review procedure is conducted at the very beginning of the process. Its purpose is to emerge areas that need to be coordinated as far as procedures, institutions and rules are concerned. The next step is to create the report which is the official opening of negations.

Project of the treaty comes into existence after negotiations covering every specific area. If it gains the acceptance of the European Parliament, it will be signed by the candidate and the rest of the European Union's countries. From this point forward the candidate gains a special status that allows it to benefit from some privileges and becomes an active observer in some authorities and agencies of the European Union. After the ratification process the treaty enters into force and the candidate country eventually becomes a member of the European Union.

The European Union offers candidate countries support in preparations to join it. It is often case that candidates have to implement certain reforms not only to adopt the rules of the EU but most of all to implement them properly. The whole process sometimes requires creating new authorities in the field of competition nutritional standards. Some of the existing institutions are also needed to be restructured. These changes require large financial outlays and investments in know-how. The European Union offers wide range of additional programs and instruments to assure to provide financial and technological support while implementing reforms. The EU also supports strategies that are going to enhance social acceptance of the process of the accession.[2]

The important aspect of the help the EU provides covers improving institutional possibilities by the structural development and the training of employees who will implement provisions of the European Union in the candidate country. The counselling in the implementation of the acquis takes form of affiliate programs. Preparing countries for the membership requires helping them among others improve infrastructure and the transport.

The candidate countries can participate in union programs for example in the field of public health or research. They can also receive support and loans from the international financial institutions. Due to the fact of country joining the European Union and becoming acquainted with the policies and instruments of EU, it will earn the right to use similar forms of financing gaining experience in using them. The European Union created the new financial instrument to support countries during the accession process based on a number of incentives and preferential terms to provide the best possible usage of union funds. This unitary Instrument for Pre-Accession Assistance, which entered

[2] *Zrozumieć rozszerzenie. Polityka rozszerzenia Unii Europejskiej* (2007), p. 8-9. Retrieved from http://ec.europa.eu/enlargement/pdf/publication/enl-understand_pl.pdf

into force on 1st January 2007, simplifies former assistance programs such as Phare, CARDS and SAPARD. It helps especially in enhancing democratic institutions and the rule of law, reforming public administration, carrying out economic reforms, promoting the respect for human rights, minority rights and gender equality, supporting the development of the civil society, advancing regional cooperation and giving a hand to sustainable development and poverty reduction. The additional goal for candidate countries is the adoption and full implementation of obligations arising from the membership.[3]

The aid is possible to receive after the accession as well. There is a financial aid for Member States that deal with serious economic difficulties to maintain the financial stability of the European Union. There were some securities introduced to make financial aid dependant on meeting certain macroeconomic conditions. It provides carrying necessary economic, fiscal, structural and supervisory reforms by the Member States which receive this aid. The European Union determined mechanisms and tools to limit the probability of a crisis.

3. DESCRIPTION OF USED METHODS OF DATA ANALYSIS

Preparation of the scope study of socio-economic development generally uses the analysis based on econometrical models or statistical data. This is due to the simplifications these models and measures represent. Incorporating them into the framework of the state of development will not be a perfect description but only a simplification highlighting its crucial aspects. This approach requires immense knowledge, experience and intuition. Synthetic measures have, however, very important advantage and most of all they are used for the quantification. They describe state of affairs with one indicator or the state of its development when analytical description requires using at least few of them.

It was decided to use taxonomic method of data analysis to prepare the analysis of the quality of life based on indicators. Through the appropriate calculations it is possible to find the answer to the question in which of analysed countries the quality of life after accession to the European Union increased the most. The ranking was created based on partial synthetic indicators which allowed to compare tested entities as far as changes in the sphere of the quality of life are concerned.

There are numerous methods that allow to describe the level of the quality of life by using a synthetic indicator. Their characteristics are that they choose indicators with the best information potential which may occur a situation that some important characteristics of the researched problem can be neglected.

The area of the research was divided into six spheres mentioned beyond: material living conditions, productive or main activity, health, education, economic and physical safety and natural living environment. Each group contains several indicators that reflect the tendency and the character of the whole group for each country. The choice of such indicators is supported by the availability of data publically published – namely, data gathered by Eurostat according to the quality of life.

The method of relative distance was used to create synthetic indicators. This method was chosen because of its clarity and universal character. It was in-depth presented among others by W. Pluta[4] and E. Nowak[5].

The relative distance from the standard was used in calculations for each measurement. Separate formulas were used for the stimulant and destimulant. This is due to the characteristic of these features because stimulant is a statistical feature that when it increases the observed phenomenon increases as well and when it decreases the phenomenon decreases as well.[6] The destimulant on the other hand is a statistical feature that when increases the observed phenomenon decreases and vice versa.[7] Thus, the formula for the stimulant (standard) is:

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[3] *Zrozumieć rozszerzenie. Polityka rozszerzenia Unii Europejskiej* (2007), p. 14-15. Retrieved from http://ec.europa.eu/enlargement/pdf/publication/enl-understand_pl.pdf

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$$H_{ij} = \frac{100(X_{ij} - X_{imin})}{X_{imax} - X_{imin}}$$

The following formula were used for the calculation of the destimulant (anti-standard):

$$H_{ij} = \frac{100(X_{imax} - X_{ij})}{X_{imax} - X_{imin}}$$

Designations: X_{ij} - empirical value of the i-th meter in the j-th country,
X_{imin} - the lowest value of the i-th meter of the countries analysed,
X_{imax} - the highest value of the i-th meter of the countries analysed.

The usage of different formulas for the stimulant and destimulant allows to get positive value for the standard and for the anti-standard as well. The distance from the standard for stimulant is the difference to the lowest value in the analysed population and for the destimulant it is the difference to the highest value in the analysed population. The scale was reduced to the interval from 0 (the worst) to 100 (the best) to make the interpretation of results even more clear.

Measuring the relative distance with a such method is commonly used in various elaborations and analyses dealing with taxonomic synthetic indicators. Worth mentioning here is a Human Development Index which is calculated for every country by United Nations.

Human Development Index (HDI) is a statistical tool using to measure socio-economic effects for each country. It was inducted by UN to make the international comparisons for every country possible. It was created in 1990 by the economist from the Pakistan - Mahbub ul Haq. It has been used since 1993 in UNDP reports.

HDI index contains three main factors: average life expectancy, GDP per capita and average years spent in school by the citizen. The ranking created based on HDI is different than the standard one based on GDP because it includes social aspects describing the general quality of life where ranking based on GDP does not. The similar character of the synthetic indicator created by authors and HDI allows to compare them in the area of the quality of life.

Every domain chosen to the analysis is described by the list of indicators below.

Table 1: List of statistical characteristics adopted for the calculation of synthetic indicators

No.	Specification	The nature of the indicator
	Economic and physical safety	
1.	Inability to face unexpected financial expenses	Destimulant
2.	Arrears (mortgage or rent, utility bills or hire purchase)	Destimulant
3.	Death due to homicide, assault, by sex. Standardised death rate by 100 000 inhabitants	Destimulant
4.	Crime, violence or vandalism in the area	Destimulant

	Education	
1.	Persons with lower secondary education attainment by age and sex (%)	Destimulant
2.	Persons with upper secondary education attainment by age and sex (%)	Stimulant
3.	Persons with tertiary education attainment by age and sex (%)	Stimulant
4.	Mobility of students in Europe	Stimulant
5.	Students in tertiary education	Stimulant
	Health	
1.	Life expectancy by age and sex	Stimulant
2.	Healthy Life Years	Stimulant
3.	Self-perceived health by sex, age and income quintile (%)	Stimulant
4.	People having a long-standing illness or health problem, by sex, age and income quintile (%)	Destimulant
5.	Self-perceived long-standing limitations in usual activities due to health problem by sex, age and income quintile (%)	Destimulant
6.	Self-reported unmet needs for medical examination by sex, age, detailed reason and income quintile (%)	Destimulant
7.	Hospital beds per 100 000 inhabitants	Stimulant
	Material living conditions	
1.	Mean and median income by age and sex	Stimulant
2.	At-risk-of-poverty rate by poverty threshold, age and sex	Destimulant
3.	Severely materially deprived people % and 1 000 persons	Destimulant
4.	Households making ends meet with great difficulty	Destimulant
5.	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
6.	Total length of motorways	Stimulant
	Natural and living environment	
1.	Pollution, grime or other environmental problems	Destimulant
2.	Noise from neighbours or from the street	Destimulant
3.	Final energy consumption	Stimulant
4.	Total fresh water abstraction per capita (m^3)	Stimulant
5.	Total greenhouse gas emissions (in CO_2 equivalent) indexed to 1990	Destimulant
	Productive or main activity	
1.	Unemployment rates by sex, age and highest level of education attained (%)	Destimulant
2.	People living in households with very low work intensity % and 1 000 persons	Destimulant
3.	Involuntary part-time employment as percentage of the total part-time employment, by sex and age (%)	Destimulant
4.	Low-wage earners as a proportion of all employees (excluding apprentices)	Destimulant
5.	Accidents at work by sex and age	Destimulant
6.	Employees working shifts/Saturdays/Sundays/Evenings/Nights as a percentage of the total of employees, by sex and age (%)	Destimulant

Source: Own elaboration

4. RESULTS OF THE ANALYSIS

There were synthetic indicators elaborated for each of six spheres characterising the quality of life in analysed countries, which are the arithmetic means of each distance from the standard (anti-standard). The same method of aggregation was used with calculations of general synthetic indicators – in this case they are the arithmetic mean of partial indicators.

Table 2 presents partial indicator for each of six domains in year 2005 and 2012. Presenting data from those two periods allows to observe the dynamics and the vector of changes in the quality of life for each domain submitted to the final synthetic indicator. Table 3, on the other hand, presents the ranking characterising the quality of life in analysed countries and parallel to the HDI. Place in the ranking is based on the level of the final synthetic indicator in 2012. Values of the synthetic indicator were shown in natural numbers because of insignificant differences values rounded to one decimal place and to make ranking more clear and legible.

Table 2: Partial indicators in each field of the research

Specification	Partial indicators in the field of											
	Economic and physical safety		Education		Health		Material living conditions		Natural and living environment		Productive or main activity	
Year	2005	2012	2005	2012	2005	2012	2005	2012	2005	2012	2005	2012
Czech Republic	77	73	48	52	54	55	70	77	47	48	64	68
Slovakia	76	79	52	59	66	49	62	65	42	43	67	65
Poland	51	72	79	81	76	56	15	46	61	60	28	36
Slovenia	81	68	41	41	56	48	79	63	41	42	84	87
Lithuania	38	54	51	55	37	49	43	43	60	58	59	51
Malta	92	77	0	0	87	86	61	57	12	0	83	88
Cyprus	72	40	50	51	60	75	59	49	15	21	71	53
Estonia	49	44	52	48	15	19	50	49	59	63	72	67
Hungary	62	40	42	41	38	48	57	40	51	58	66	54
Latvia	4	7	42	46	14	27	20	22	38	40	59	41

Source: Own elaboration

Table 3: Rating of the quality of life in countries of European Union accession class of 2004

Specification	Synthetic indicator		HDI		Position by synthetic indicator	
	2005	2012	2005	2012	2005	2012
Czech Republic	60	62	0,862	0,873	3	1
Slovakia	61	60	0,814	0,84	2	2
Poland	52	59	0,798	0,821	7	3
Slovenia	64	58	0,876	0,892	1	4
Lithuania	48	52	0,802	0,818	9	5
Malta	56	51	0,827	0,847	4	6
Cyprus	54	48	0,817	0,848	5	7
Estonia	49	48	0,83	0,846	8	7
Hungary	53	47	0,82	0,831	6	9
Latvia	29	31	0,792	0,814	10	10

Source: Own elaboration

There can be noticed plenty of relationships when analysing each partial indicator that submitted to the value of the final synthetic indicator. Malta was dominating right after the accession in the economic and physical safety sphere with the indicator's rate of 92. The lowest value in 2005 was noticed in Latvia with a devastating loss to dominating Malta (indicator for Latvia was 4 in 2005). In 2012 Malta lost its position (indicator fell down to 77) to Slovakia that reached the value of the indicator of 79. The lowest indicator was again in Latvia (7). The increasing tendency can be seen only

for Poland (from 51 to 72) and Slovakia (from 76 to 79). The rest of analysed countries noted smaller or larger decreases over 7 years.

In the education sphere in 2005 the highest value of the indicator was noted in Poland (79). The lowest indicator, on the other hand, was received for Malta which was 0. Such value does not mean the zero level of education but immense differences in the level of studied characteristics between Malta and other countries. In 2012 Poland noted the increase of the indicator to the level of 81 and it remained the highest observed value. The lowest rate was again in Malta staying at the zero level. It is worth noticing that over 7 years indicators in the education sphere have not been changing significantly. The greatest progress can be observed in Slovakia where the indicator increased from 52 in 2005 to 59 in 2012.

The health area favours Malta with the indicator of 87 in 2005 that fell down a little (to 86) in 2012. The lowest level can be noticed in Latvia with the indicator of only 14. In Estonia in 2005 this indicator was higher not by much (it reached the level of 15). After 7 years those countries switched positions making Estonia the worst country as far as the health's area is concerned in 2012 with the indicator of 19. Latvia over this time noted the increase in this indicator to 27. In many of analysed countries the indicator for the health's area decreased after 7 years what can be explained by the engagement in their jobs and economic activity (observation for Poland, Slovenia and Slovakia). The rest of analysed countries remain this indicator growing.

Poland with the indicator of 15 is the worst country as far as material living conditions are concerned. Slovenia noted the highest rate of this category – 79. The value of this indicator decreased over 7 years in many analysed countries. The increasing trend remained only for Czech Republic, Poland, Slovakia and Latvia (the indicator for Lithuania did not change over 7 years). The highest rate in 2012 is noticed for Czech Republic (77) and the lowest – Latvia (22). The rapid growth of this indicator for Poland is worth noticing because its value of 46 in 2012 allowed to overtake Latvia, Hungary and Lithuania.

Natural and living environment is often ignored when analysing the quality of life. However, it has a considerable impact on living conditions of citizens. In many countries in 2005 this indicator was low – Malta (12) and Cyprus (15) noted the lowest rates. The first three countries were Poland (61), Lithuania (60) and Estonia (59). The indicator of this category was changing over 7 years and the interesting phenomenon may be noticed – Malta noted overall decrease of this indicator to the zero level. In other countries it was not changing much and the decreasing tendency apart from Malta mentioned above was noticed only for Lithuania and Poland. However, those declines were not significant. The highest level in 2012 was noted for Estonia – 63.

Last but not least is the productive or main activity indicator. Slovenia noted the highest rate of it which was 84. Differences were high and only Malta remained the level of this indicator in 2012 which was close to the one noted in 2005 (in 2005 – 83, in 2012 - 88). The lowest value of the indicator was noted for Poland – 28, which was a weak result compared to other countries. In 2012 the highest rate as mentioned before belonged to Malta followed by Slovenia (87). Poland was again the worst country in this area with the indicator of 36. Such declines of the indicator may be connected to the financial crisis that occurred in the last years of the research. However, countries like Malta, Slovenia, Poland and Czech Republic remained the increasing tendency.

Some conclusions can be drawn according to the final synthetic aggregate. It was changing differently for each country. It was increasing over 7 years in Czech Republic, Poland, Lithuania and Latvia and for the rest of analysed countries the indicator covering the quality of life was decreasing. This is important when compared to HDI that was increasing in each tested entity over analysed time. It shows that HDI, being better than GNP as far as the quality of life is concerned, is not covering many variables that substantially influence the quality of life (the quality of the natural environment, economic and social safety or health of citizens may be examples). Therefore, Human Development Index is far not capacious enough to present a clear and actual image how the quality of life is changing over years. Definitely more variables should be taken under consideration and calculated to present the image closer to the truth. The indicator created by authors is more comprehensive aggregate and gives clearer insight to the quality of life and how it was changing. It is, however, more complicated and data measurements are more difficult to conduct. Therefore, this process is time-

consuming but may be treated as an interesting alternative to the HDI as far as researches covering the issue of the quality of life are concerned.

The ranking was created to summarise the whole analysis. In 2005 the first three countries were Slovenia, Slovakia and Czech Republic. Last place was taken by Latvia. There were changes in the ranking's positions after 7 years since analysed countries have joined the European Union. Czech Republic promoted to the first place, overtaking Slovakia and Poland, to become the first three in 2012. Latvia remained in the last position which shows that this country does not take a full advantage of chances the membership in the European Union is providing.

5. CONCLUSIONS

The article shows how difficult the analysis of the idea of the quality of life can occur. This problem is very comprehensive and there may be many various approaches to it. The creation of the synthetic indicator can be one of them. It allows to present results of the research in the ranking that will show the gap and space for improvements for tested entities.

The accession to the European Union gives a lot of benefits and opportunities. They have to be, however, utilized effectively and in a proper way to reveal their complete potential. The article also shows, on the example of countries inducted to the European Union class of 2004, that this process may be conducted fluently what has a reflection in their level of the quality of life. Unfortunately, certain countries fall behind and it takes time for them to assimilate. This article may help them find areas that need improvement which will affect the quality of life of their citizens directly.

The presented synthetic indicator was compared to the more popular one being used in this area of research which is Human Development Index. It was observed that HDI was constantly increasing over time. Such trend was not common for the synthetic indicator created by authors. It shows that HDI being a universal and somehow effective cannot be solely used to analyse the quality of life. This problem is far more complex to limit researches only to one simple indicator covering few variables.

The quality of life is an important issue because it influences on human capital which is the main factor having an impact on economic growth. Education as a part of the indicator shows how deep are links between the knowledge society and quality of life. The better the learning conditions are, the more qualified labour force on the market, which results in better development of the whole country.

Drawing conclusions, certain things should be noticed. Indicators created for the analysing the quality of life have to progressively comprehensive. The aggregate used for analyses should be extensive that will allow to gather more complex information about different aspects of the problem. Another essential observation is that social variables are definitely more important when analysing the quality of life. Economic ones are naturally important but they do not reflect some of significant spheres of human life when treated as the main determinants. Therefore, researches covering the quality of life should be constantly conducted and improved. If there are factors that will help perfect the welfare of societies, they are certainly hidden under the category of the quality of life.

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