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tel. (22) 593 55 20 (-22; -25 – sales)
e-mail: wydawnictwo@sggw.pl
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CONSUMERS ON ORGANIC FOOD MARKET – FACTORS DETERMINING THE CHOICE OF DAIRY PRODUCTS

Marek Angowski✉, Barbara Bujanowicz-Haraś

University of Life Sciences in Lublin

ABSTRACT

The aim of the publication is to identify and evaluate the factors determining the choice of organic food products, establish links between them and decide which factors determining consumer choices on the dairy products market are the main. The analyses were based on the results of a survey conducted in 2016 on a group of 358 students. In the selection process, targeted selection methods were used. The study was carried out using the CAWI and the PAPI methods. The study uses methods of statistical analysis, including a comparative analysis of the behaviour of buyers and non-buyers of organic products and factor analysis to detect internal interdependencies between factors shaping purchasing decisions of buyers. Based on the analysis, it can be concluded that the most important factors taken into consideration when choosing organic food on the dairy market are related to the characteristics of the products. According to the surveyed buyers, an organic product is a product with a specific composition, fresh and without preservatives. The remaining factors are marketing communication, sales activation and "guarantee" of quality and healthiness of products in the form of certificates, markings and product brands.

Key words: organic food, product selection, dairy products
JEL codes: D12, M30

INTRODUCTION

The development of the human population, economic growth and progress of civilisation are nowadays connected with excessive and at the same time increasing consumption of various goods and services, many times not justified by actual needs, which generates a wide range of often incremental and negative consequences both in the individual or social but also ecological sphere [Wasilik 2014]. Their reduction or elimination often requires verifying and reorienting the purchasing behaviour towards green consumption. Consumption of organic food fits in this trend.

Organic food is a category of food products produced by means of ecological farming (organic, biological, biodynamic), that is, an ecologically, economically and socially sustainable management system based solely on natural production methods. Through the stimulation of natural production mechanisms it creates conditions for nurturing, enhancing prolificacy and improving fertility of soil, contributes to ensuring the healthiness of plant and animal organisms and makes it possible to obtain high quality agricultural products. The credo of this type of farming is giving up the use of agricultural chemicals for the sake of biological, mechanical or agrotechnical treatment [Sołtysiak 1995, Pilarczyk and Nestorowicz 2010, Bujanowicz-Haraś 2011].

The quintessence of organic farming is unquestionably delivering a peculiar type of product. Eco-food is a type of food produced by organic methods respecting strict rules, meeting specific criteria described in detail by respective regulations, subject to the

Marek Angowski https://orcid.org/0000-0003-1669-5073; Barbara Bujanowicz-Haraś https://orcid.org/0000-0001-6431-3362
✉marek.angowski@up.lublin.pl

procedure of control, certification and proper marking, which affects the development of its identity, increases identifiability and recognisability by present and also potential buyers, and guarantees the optimum quality [Żakowska-Biemans and Gutkowska 2003].

In the process of selecting a food product a special role is assigned to characteristics associated with the product and the perception of such characteristics. The characteristics attributed to an organic food product testify to its peculiarity. They can be defined as private good values and public good values. The first category comprises values also referred to as use values that are distinguished by projection connected with perception of the characteristics of eco-foods such as taste, freshness or healthiness dictated by the needs and expectations of buyers and their families. In turn, public good values include protection of the natural environment, also in the light of relations between the environment and the used methods of agricultural production, and animal welfare [Łuczka-Bakuła 2007]. The attractiveness of food is determined by characteristics building its sensory quality such as taste, aroma, and appearance. Its value is also determined by the presence of nutrients necessary to ensure correct functioning of the body (including carbohydrates, proteins, fats or vitamins), that is, so-called nutritional value of food. An attribute of food products is their healthiness, most often associated with their physical or chemical purity (occurrence of contaminants, i.e. for instance residues of chemical pesticides, heavy metals, pharmacological substances, namely hormones, antibiotics) and microbiological purity (specific microflora) [Szołtysek 2004, Czernyszewicz 2009]. Products from organic sources, in comparison to those produced by conventional methods, are generally characterized by lower content of nitrates, nitrites and residues of pesticides, but they show increased levels of minerals, vitamins (and in particular vitamin C), dry mass or carbohydrates etc. [Bourn and Prescott 2002, Rembiałkowska 2002, Crinnion 2010, Lairon 2010, Winter 2012]. The indicated attributes of organic food to an essential degree determine the purchasing decisions of buyers of such food [Padel and Foster 2005, Żakowska-Biemans 2011, Wojciechowska-Solis and Soroka 2016]. As emphasized by Pilarczyk and Nestorowicz [2010], an organic product is not only a marginal good but it carries a specific idea, that is, environmental protection with simultaneous care about consumers' health. It must be mentioned that for the eco-products purchasing process there are also other significant factors that matter, such as product price, the place where one can buy the product and insufficient knowledge of the rules of eco-food production and marking [Żakowska-Biemans 2011, Ozguven 2012, Bryła 2015].

Organic products are more and more often noticed and they are more eagerly purchased. They constitute an alternative to those produced by conventional methods. The development of the organic products market has been relatively dynamic but it is still a niche market and changes occurring there are determined both by the supply of organic food products and the preferences and behaviours of consumers. The observed value of eco-food sales has been continuously increasing. According to Organic Monitor, in 2000–2015 it increased more than four times on a global scale (356%), and in 2015 it reached EUR 75.7 billion. At the same time, the European market of organic products was characterised by 325.7% growth in sales (by EUR 22.8 billion). In 2015 the value of sales amounted to EUR 29.8 billion. In turn, in the territory of the European Union sales in 2000–2015 went up by 316.9%, i.e. EUR 20.6 billion (2015 – EUR 27.1 billion). In Poland sales of organic food in 2015 oscillated around EUR 167 million [Domańska et al. 2015, Willer and Lernoud 2017].

Available literature most frequently contains studies regarding the analysis of organic product choices on the food market, that mainly focus on the qualitative aspects of the product. Therefore, the authors attempted to extend the analysis by aspects related to sales promotion.

The aim of this paper is to identify and evaluate factors determining the choice of organic food products, establish links between them and indicate the main factors influencing consumer choices on the dairy products market.

DATA AND METHODS

The analyses presented in this paper were based on the results of surveys conducted in 2016 involving a group of 358 students (as a very important group of buyers

in the future). Respondents were selected according to the targeted selection method. The main data collection method was the CAWI, with the support of the PAPI. The questionnaire was developed in an electronic version, made available online and linked to a database (SurveyMonkey platform). It consisted of 18 problem questions regarding the assessment of behaviours and attitudes of buyers on the food products market with a particular focus on factors shaping the product choice process and on the place of purchase. The surveys covered four groups of products: meat, fruits and vegetables, dairies and cereals.

The authors focused on the analysis of factors linked to the choice of organic food products on the dairy products market. In order to verify the aspects taken into consideration by respondents in their choices of dairy products, they were presented with a list of 33 factors that could potentially influence such choices and were asked to rate the significance of respective factors according to a five-point Likert scale, where 1 was equivalent to insignificant, 2 – rather insignificant, 3 – difficult to say, 4 – rather significant, 5 – definitely significant. In order to facilitate the analysis and presentation of responses, the factors were split into two categories: factors connected with product characteristics (*P*1 – appearance, *P*2 – taste, *P*3 – aroma, *P*4 – quality, *P*5 – ingredients, *P*6 – nutritional values, *P*7 – lack of preservatives, *P*8 – freshness, *P*9 – low fat content, *P*10 – healthiness, *P*11 – best before date, *P*12 – quality certificates) and factors connected with sales promotion (*SP*1 – price, *PS*2 – discounts, *PS*3 – brand, *PS*4 – "eco" markings, *PS*5 – traditional recipe, *PS*6 – appearance of packaging, *PS*7 – packaging size, *PS*8 – availability in store, *PS*9 – possibility to taste the product in store, *PS*10 – loyalty programmes, *PS*11 – exhibition in store, *PS*12 – promotional sales in store, *PS*13 – TV commercials, *PS*14 – radio commercials, *PS*15 – press advertising, *PS*16 – billboards, *PS*17 – recommendations from family/friends, *PS*18 – recommendations from the seller, *PS*19 – positive opinions on the product/ producer in mass media, *PS*20 – country of origin, *PS*21 – regional producer, *PS*22 – fashion trends).

Primary data were processed using statistical analysis methods, including comparative analysis of the behaviour of customers buying and not buying organic products and factor analysis to detect internal interdependencies between factors shaping the purchasing decisions of organic food buyers.

RESULTS AND DISCUSSION

The first stage of analysis verified the existence of differences in the significance of factors connected with the characteristics of a food product taken into account by the surveyed buyers and non-buyers of organic food in their product choices (Table 1). With reference to buyers of organic products it should be mentioned that when making decisions regarding the purchase the surveyed buyers attached greater attention to the analysed characteristics of the products than the "non-buyers" did. In the first place, they paid attention to the ingredients and sensory characteristics of products such as aroma and taste. The biggest differences between groups of buyers can be observed in the perception of the significance of certificates of product quality, healthiness and the lack of preservatives. In order to identify significant statistical differences between the observed groups (buyers and non-buyers of organic food), additional statistical analysis was carried out using the Mann–Whitney U test. This test confirms statistically significant differences in the rating of significance of factors determining product choices between respondents representing respective groups of buyers. Those were the following factors: product quality, ingredients, and nutritional values, lack of preservatives, low fat content, product healthiness, and quality certificates.

The next stage comprised an analysis of relationships between the effect of sales promotion measures and decisions regarding the choice of food products in the groups of buyers of organic food and other buyers (Table 2). Both buyers and non-buyers of organic food in their purchasing decisions are mainly guided by the buying cost (price and discounts) and availability of products in stores. The biggest differences can be observed in the evaluation of significance of eco-markings, traditional methods of production, promotional sales and publicity. The Mann–Whitney U test confirms statistically significant differences between the evaluations given by respondents representing respective groups of buyers regarding factors connected

Table 1. Comparison of significance of factors connected with product characteristics in the product selection process

Factor	Organic products purchase (mean factor rating[b])		Difference in means (buyers *vs*. non-buyers)
	buyers	non-buyers	
*P*1	4.432 (9)	4.296 (5)	0.136
*P*2	4.691 (3)	4.653 (2)	0.038
*P*3	4.716 (1)	4.571 (3)	0.145
*P*4	4.660 (5)	4.265 (7)	0.395[a]
*P*5	4.698 (2)	4.265 (6)	0.432[a]
*P*6	4.654 (6)	4.214 (8)	0.440[a]
*P*7	4.593 (8)	3.980 (9)	0.613[a]
*P*8	4.673 (4)	4.663 (1)	0.010[a]
*P*9	4.204 (11)	3.643 (10)	0.561[a]
*P*10	4.315 (10)	3.480 (11)	0.835[a]
*P*11	4.630 (7)	4.510 (4)	0.119
*P*12	4.142 (12)	2.980 (12)	1.162[a]

(*x*) – factor significance ranking based on the mean rating.
[a]Statistically significant differences, Mann–Whitney U test, level of significance: $p < 0.05$.
[b]Mean rating of significance of the characteristics according to five-point Likert scale, where 1 was equivalent to insignificant, 2 – rather insignificant, 3 – difficult to say, 4 – rather significant, 5 – definitely significant.

Source: Own elaboration based on surveys.

Table 2. Comparison of significance of factors connected with sales promotion measures in the product selection process

Factor	Organic products purchase (mean factor rating[b])		Difference in means (buyers *vs*. non-buyers)
	buyers	non-buyers	
*PS*1	4.389 (1)	4.122 (1)	0.266
*PS*2	4.179 (3)	3.459 (3)	0.720[a]
*PS*3	4.012 (6)	2.908 (10	1.104[a]
*PS*4	3.790 (10)	1.867 (17)	1.923[a]
*PS*5	3.944 (7)	2.663 (7)	1.281[a]
*PS*6	4.037 (5)	2.969 (8)	1.068[a]
*PS*7	4.080 (4)	3.000 (6)	1.080[a]
*PS*8	4.272 (2)	3.776 (2)	0.496[a]
*PS*9	3.222 (16)	2.020 (16)	1.202[a]
*PS*10	3.198 (17)	2.122 (15)	1.075[a]
*PS*11	3.420 (15)	2.296 (14)	1.124[a]
*PS*12	3.704 (12)	3.153 (4)	0.551[a]
*PS*13	3.043 (18)	1.837 (20)	1.206[a]
*PS*14	2.809 (22)	1.673 (22)	1.135[a]
*PS*15	2.815 (21)	1.755 (21)	1.060[a]
*PS*16	2.883 (20)	1.837 (19)	1.046[a]
*PS*17	3.722 (11)	2.867 (11)	0.855[a]
*PS*18	3.432 (14)	2.306 (13)	1.126[a]
*PS*19	3.457 (13)	2.408 (12)	1.049[a]
*PS*20	3.926 (8)	3.092 (5)	0.834[a]
*PS*21	3.877 (9)	2.939 (8)	0.938[a]
*PS*22	2.957 (19)	1.867 (18)	1.089[a]

(*x*) – factor significance ranking based on mean rating.
[a]Statistically significant differences, Mann–Whitney U test, level of significance: $p < 0.05$.
[b]Mean rating of significance of the characteristics according to five-point Likert scale, where 1 was equivalent to insignificant, 2 – rather insignificant, 3 – difficult to say, 4 – rather significant, 5 – definitely significant.

Source: Own elaboration based on surveys.

with sales promotion measures in the product selection process. The only factor for which there are no statistically significant differences between evaluations given by buyers and non-buyers of organic products is the price.

It can be observed that generally the surveyed buyers of organic food give higher rating to the significance of respective factors in the product selection process. It is clear both with regard to product-related factors and those connected with sales promotion. Analysing many factors and identifying their significance in terms of quality and marketing, they make conscious purchasing decisions.

In order to analyse the problem more thoroughly, a factor analysis involving varimax orthogonal rotation of factors was performed. The factor analysis is a set of statistical methods and procedures thanks to which a large number of analysed variables can be reduced to a considerably smaller number of factors or principal components independent of one another. In marketing surveys, factor analysis is used, among other purpos-

es, for formulating conclusions on the structure of the analysed phenomenon, that is, for identifying general relationships in the analysed phenomenon [Walesiak and Bąk 1997, Balon and Dziadkowiec 2016]. One of the most popular statistical techniques applied in factor analysis for the analyses of behaviours (responses) of consumers in the market is the principal component analysis. As a result of factor analysis, an originally large set of variables is reduced to a few principal components determining, e.g. the choice of the specific product by the consumer [Kaczmarek 2016].

Analytical activities in the PCA include the following [Mruk 2003]:

- selection of variables for analysis;
- determining the matrix of correlations and eliminating variables with low correlations;
- identifying and rotating the factors;
- interpreting the results.

Based on the level of explanation of variances set at 62.80%, four principal components were identified (Table 3). By interpreting the scope of information conveyed by the respective components, factors determining the choice of organic food products in the sample of respondents were identified. The features for respective determinants of the choice of organic products on the dairy products market are as follows:

- component 1 – qualitative characteristics of the product, factors connected with ingredients, product freshness, lack of preservatives, quality and nutritional values;
- component 2 – market information/communication, factors connected with advertising on TV and in press and recommendations of salespeople and friends;
- component 3 – sales promotion, factors connected with marketing activities in store, mainly price discounts, appearance of the packaging on the shelf and promotional sales;
- component 4 – "quality guarantee", factors connected with product markings and the "perceived" healthiness of such products.

Based on the performed analyses, it can be concluded that the most important factors taken into consideration when choosing organic food on the dairy

Table 3. Rotated component matrix

Specification		Component			
		1	2	3	4
Factor influencing purchasing decisions	*P*1	0.523	0.087	0.428	–0.085
	*P*2	0.585	–0.138	0.195	0.321
	*P*3	0.785	–0.087	0.166	0.079
	*P*4	0.810	0.059	0.090	0.166
	*P*5	0.851	0.103	0.087	0.129
	*P*6	0.799	0.110	0.087	0.172
	*P*8	0.832	0.079	0.095	0.085
	*P*9	0.476	0.128	0.386	0.114
	*P*10	0.322	0.048	0.161	0.781
	*P*11	0.738	0.030	0.149	0.116
	*P*7	0.828	0.048	0.094	0.168
	*PS*1	0.430	0.030	0.568	–0.012
	*PS*2	0.266	0.142	0.697	–0.055
	*PS*6	0.146	0.164	0.673	0.210
	*PS*7	0.179	0.134	0.715	0.140
	*PS*11	0.061	0.458	0.608	0.293
	*PS*9	–0.119	0.322	0.583	0.425
	*PS*10	–0.080	0.342	0.613	0.383
	*PS*12	0.105	0.263	0.613	0.189
	*PS*13	–0.014	0.835	0.332	0.020
	*PS*14	–0.036	0.807	0.318	0.047
	*PS*15	–0.020	0.817	0.352	–0.017
	*PS*16	0.029	0.755	0.384	–0.032
	*PS*17	0.163	0.760	0.102	0.066
	*PS*18	0.044	0.821	0.091	0.041
	*PS*19	0.010	0.772	0.074	0.041
	*PS*22	–0.056	0.666	0.234	0.169
	*P*12	0.492	0.047	0.210	0.586
	*PS*5	0.268	0.104	0.157	0.825
	*PS*3	0.271	0.170	0.621	0.132
	*PS*4	0.237	0.183	0.308	0.658
	*PS*20	0.372	0.569	–0.174	0.227
	*PS*21	0.416	0.541	–0.116	0.204
Total loadings		6.635	6.223	4.877	2.986
% variance of the SS loadings rotation		20.11	18.86	14.78	9.05
Accumulated % of the SS loadings rotation		20.11	38.97	53.75	62.80

Rotation extraction method: varimax with Kaiser normalization, KMO (Kaiser–Mayer–Olkin) test – 0.867.

Source: Own elaboration based on surveys.

products market relate to the characteristics of the products. According to the respondents, an organic product is a product with specific ingredients, fresh and without preservatives. The second group comprises advertising aspects. In the contemporary world information is the key to shaping consumer preferences and behaviours. On the one hand, thanks to new communications technologies businesses and sellers can increase the reach of information on their offer to potential customers. On the other hand, though, the consumer awareness of the present-day buyers is higher, which makes the information a particularly significant factor in developing competitive advantage [Szwacka-Mokrzycka 2013]. Another identified group of factors that determine the choices of the surveyed buyers is merchandising connected to sales promotion in store. This is a very significant factor with reference to places where food, including organic food, can be bought – hypermarkets and discount stores being predominant facilities [Lipowski and Angowski 2014]. The last group is factors providing a "guarantee" of quality and healthiness of products in the form of certificates, markings and product brands.

SUMMARY

Faced with growing social awareness of the revealing negative effects of civilisation development, mutual relationships between the quality of food and the environmental conditions and production methods, the direction of transformations characterising the market of organic food products does not raise doubts. To a large extent its development is determined by the expectations and behaviours of "eco"-food buyers. The degree to which the requirement of organic food is declared is created by a number of factors and it has been continuously evolving. Thus, taking the aforementioned into account, it is particularly significant to acquire current information about attitudes of customers buying an organic product.

The main purpose of the analysis was to identify principal factors connected with the effect of product characteristics and sales activities on the preferences of the surveyed respondents regarding the choice of organic foods on the dairy products market. Four aggregated groups of factors determining product choices were identified. Based on the performed analyses, it can be concluded that the most significant determinant of buying preferences on the dairy products market was the group of factors connected with the qualitative characteristics of the product. In choosing organic products, respondents pay attention to the quality of food, its ingredients, and freshness, lack of preservatives, quality and nutritional values. In addition, the surveyed buyers declared that market information is important in the process of selecting organic food as it improves their knowledge about eco-foods. Of course, the reliability of such information reaching potential buyers through the press and TV advertising in the context of so-called bio-foods being available on the market, may be questionable.

Surveys and conclusions referring to the preferences of buyers on the organic products market presented in this paper may form grounds for subsequent, more thorough surveys and analyses, which can contribute to improving the understanding of the food market, splitting the market into segments, and as a consequence the market offer may be enhanced when an adequate marketing strategy is developed.

REFERENCES

Balon, U., Dziadkowiec, J. (2016). Wykorzystanie koncepcji Food Related Lifestyles (FRL) do analizy aspektów jakościowych wpływających na zwyczaje żywieniowe [The use of the Food Related Lifestyles (FRL) concept in the analysis of qualitative aspects influencing eating habits]. Marketing w Praktyce, 9, 24–34.

Bourn, D., Prescott, J. (2002). A comparison of the nutritional value, sensory qualities and food safety of organically and conventionally produced foods. Critical Reviews in Food Science and Nutrition, 42 (1), 1–34.

Bryła, P. (2015). Marketing regionalnych i ekologicznych produktów żywnościowych, Perspektywa sprzedawcy i konsumenta [Marketing of regional and organic food products. Seller and consumer perspective]. Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Bujanowicz-Haraś, B. (2011). Stopień zróżnicowania terytorialnego rozwoju rolnictwa przyjaznego środowisku naturalnemu w Polsce [Degree of territorial differentiation in the development of environment-friendly agriculture in Poland]. Ochrona Środowiska i Zasobów Naturalnych, 49, 472–483.

Crinnion, W. (2010). Organic foods contain higher levels of certain nutrients, lower levels of pesticides, and may provide health benefits for the consumer. Alternative Medicine Review, 15 (1), 4–12.

Czernyszewicz, E. (2009). Zmienność preferencji konsumentów w zakresie metod produkcji owoców [Variablity of the preferences of consumers with regard to fruit production methods]. Journal of Agribusiness and Rural Development, 1 (11), 1–9.

Domańska, K., Komor, A., Krukowski, A., Nowak, A. (2015). Funkcjonowanie wybranych ogniw łańcucha żywnościowego w Polsce w kontekście rozwoju biogospodarki [Functioning of selected elements of the food chain in Poland in the context of bioeconomic development]. Wydawnictwo Uniwersytetu Przyrodniczego w Lublinie, Lublin.

Kaczmarek, M. (2016). Zastosowanie analizy głównych składowych w ewaluacji skali pomiaru użyteczności serwisu internetowego [Using the principal components analysis in the evaluation of the scale for measuring website usability]. Studia Oeconomica Posnaniensia, 1 (4), 128–141.

Lairon, D. (2010). Nutritional quality and safety of organic food. A review. Agronomy for Sustainable Development, 30, 33–41.

Lipowski, M., Angowski, M. (2014). Zachowania rynkowe nabywców produktów żywnościowych w sklepach dyskontowych [Market behaviours of food buyers in discount stores]. Handel Wewnętrzny, 3 (349), 125–137.

Łuczka-Bakuła, W. (2007). Rynek żywności ekologicznej [Organic food market]. PWE, Warszawa.

Mruk, H. (Ed.) (2003). Analiza rynku [Market analysis]. PWE,Warszawa.

Ozguven, N. (2012). Organic food motivations factors for consumers. Procedia – Social and Behavioral Sciences, 62, 661–665.

Padel, S., Foster, C. (2005). Exploring the gap between attitudes and behaviour. Understanding why consumers buy or do not buy organic food. British Food Journal, 107 (8), 606–625.

Pilarczyk, B., Nestorowicz, R. (2010). Marketing produktów ekologicznych [Organic products marketing]. Oficyna a Wolter Kluwer business, Warszawa.

Rembiałkowska, E. (2002). Jakość żywności pochodzącej z gospodarstw ekologicznych, Jakość żywności a rolnictwo ekologiczne [Quality of food from organic farms. Food quality and organic farming]. [In:] D. Kołożyn-Krajewska (Ed.), Jakość żywności a rolnictwo ekologiczne [Food quality and organic farming]. One-day workshop organised as the Accompanying Measure to Flair-Flow Europe IV Project, Kraków. Polskie Towarzystwo Technologów Żywności [manuscript]. Retrieved from http://www.pttz.org/flair/info/zyw_ekol.rtf [accessed: 30.10.2018].

Sołtysiak, U. (1995). Rolnictwo ekologiczne. Od producenta do konsumenta [Organic farming. From producer to consumer]. Stowarzyszenie Ekoland, Stiftung Leben & Umwelt, Warszawa.

Szołtysek, K. (2004). Zarys problematyki żywności ekologicznej [An outline of organic food issues]. Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu, Wrocław.

Szwacka-Mokrzycka, J. (2013). Tendencje rozwojowe popytu i podaży żywności w Polsce [Food supply and demand development trends in Poland]. Wydawnictwo SGGW, Warszawa.

Walesiak, M., Bąk, A. (1997). Wykorzystanie analizy czynnikowej w badaniach marketingowych [The use of factor analysis in marketing surveys]. Badania Operacyjne i Decyzje, 1, 75–87.

Wasilik, K. (2014). Trendy w zachowaniach współczesnych konsumentów – konsumpcjonizm a konsumpcja zrównoważona [Trends in the behaviours of present-day consumers – consumerism vs. sustainable consumption]. Konsumpcja i Rozwój, 1 (6), 66–74.

Willer, H., Lernoud, J. (2017). The world of organic agriculture – statistics and emerging trends 2017. FIBL & IFOAM – Organics International, Bonn.

Winter, C. (2012). Pesticide residues in imported organic and "suspect" fruits and vegetables. Journal of Agricultural and Food Chemistry, 60 (18), 4425–4429.

Wojciechowska-Solis, J., Soroka, A. (2016). Kryteria zakupu żywności ekologicznej przez polskich konsumentów w odniesieniu do konsumpcji światowej [Organic food purchasing criteria used by Polish consumers in comparison to global consumers]. Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie, Problemy Rolnictwa Światowego, 16 (2), 353–362.

Żakowska-Biemans, S. (2011). Polish consumer food choices and beliefs about organic food. British Food Journal, 113 (1), 122–137.

Żakowska-Biemans, S., Gutkowska, K. (2003). Rynek żywności ekologicznej w Polsce i w krajach Unii Europejskiej [Organic food market in Poland and in the member states of the European Union]. Wydawnictwo SGGW, Warszawa.

Angowski, M., Bujanowicz-Haraś, B. (2019). Consumers on organic food market – factors determining the choice of dairy products. Acta Sci. Pol. Oeconomia 18 (2), 5–12, DOI: 10.22630/ASPE.2019.18.2.14

CZYNNIKI KSZTAŁTUJĄCE WYBÓR PRODUKTÓW MLECZARSKICH PRZEZ KONSUMENTÓW NA RYNKU ŻYWNOŚCI EKOLOGICZNEJ

STRESZCZENIE

Celami publikacji są identyfikacja i ocena czynników decydujących o wyborze ekologicznych produktów żywnościowych, ustalenie powiązań między nimi oraz określenie głównych czynników determinujących wybory konsumentów na rynku produktów mleczarskich. Analizy zostały opracowane na podstawie wyników badań ankietowych przeprowadzonych w 2016 roku na grupie 358 studentów. W doborze zastosowano metody doboru celowego. Badanie zrealizowano metodami CAWI i PAPI. W opracowaniu wykorzystano metody analizy statystycznej, w tym analizę porównawczą zachowań kupujących i nie kupujących produkty ekologiczne oraz analizę czynnikową w celu wykrycia wewnętrznych współzależności między czynnikami kształtującymi decyzje nabywcze kupujących. Na podstawie analiz można stwierdzić, że najistotniejsze zagregowane czynniki brane pod uwagę przy wyborze ekologicznej żywności na rynku produktów mleczarskich związane są z cechami produktów. Według badanych nabywców produkt ekologiczny to produkt o określonym składzie, świeży i bez konserwantów. Pozostałe czynniki to komunikacja marketingowa, aktywizacja sprzedaży oraz „gwarancja" jakości i zdrowotności produktów w postaci certyfikatów, oznaczeń i marek produktów.

Słowa kluczowe: żywność ekologiczna, wybór produktu, produkty mleczarskie

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THE INTRA-EUROPEAN UNION TRADE OF MILK AND DAIRY PRODUCTS

Piotr Bórawski[1]✉, Adam Pawlewicz[1], Jayson K. Harper[2], James W. Dunn[2]

[1] University of Warmia and Mazury in Olsztyn
[2] Pennsylvania State University

ABSTRACT

The study analyzed the intra-European Union trade of milk and dairy products in 1998–2017. The volume of intra-EU imports and exports, the balance of trade and the share of imports and exports of milk and dairy products in total EU trade in the EU in 2000–2017 were analyzed. In addition, the price of 1 kg of milk and dairy products imported and exported in the EU's internal market in 2015–2017 was presented in the EU countries (EUR). Tabular, graphical and descriptive statistics were used in the work. In 2004–2014, the volume of intra-EU exports exceeded imports. In turn, in 2015–2017 a strong downward trend and an increase in the surplus of imports over the exports of milk and dairy products on the EU's internal markets is noticeable.

Key words: milk, milk product, imports, exports, balance
JEL codes: F10, F13, F17

INTRODUCTION

Milk is the most important European Union agricultural product in terms of value, accounting for around 22% of the EU's agricultural output [EDA 2018]. Annual average consumption per capita in the EU corresponds to around 300 kg of milk [Westhoek et al. 2011, Benedek et al. 2017]. The dairy sector, subjected to intensive adaptation processes by the current requirements regarding both production and consumer preferences, is systematically transforming into one of the most modern food industry sectors, capable of competing not only in the enlarged EU, but also in the world [Stańko 2006, Parzonko 2009]. Dairy products are the second most important source of animal protein for humans [Benedek et al. 2017].

The milk market is subject to regulations resulting from the Common Agricultural Policy. Until April 2015, milk production was regulated under the quota system and a price support system for butter and milk powder was in force [Bórawski and Dunn 2015].

In 2004 and 2007 12 New Member States (NMS) joined the EU. This process created many changes in the Common Market. First, the EU-15 has increased food trade in the NMS and second the deficit in agri-food products on the NMS level was observed [Pawlak 2013, Török and Jámbor 2013]. The enlargement of NMS caused changes not only in milk markets but also whole food sector because of various economic and non-economic conditions, including lifestyle, consumption growth, decreasing area of land for production and other [Gołębiewski 2018, Pietrzak and Roman 2018].

With the growth of the EU, new member states gained access to the Common Market [Szajner 2018]. On the other hand, the elimination of trade barriers, such as customs duties, made it possible for the coun-

Piotr Bórawski https://orcid.org/0000-0002-6616-7140; Adam Pawlewicz https://orcid.org/0000-0002-7381-0536; Jayson K. Harper https://orcid.org/0000-0002-0681-9362; James W. Dunn https://orcid.org/0000-0002-6643-8617
✉pboraw@uwm.edu.pl

tries that already belong to the Community to access these new markets in the internal market. This resulted in increased competitiveness in the Common Market, although many processing enterprises and agricultural producers gained development opportunities. The particular benefits of European integration were recorded in the milk market, where milk overproduction could have been sold.

MATERIAL AND METHODS

The main objective of the research was to analyze the size and value of intra-EU trade of milk and dairy products.

The research material were Eurostat data including the size and value of aggregated imports and exports, as well as the trade balance within the EU for milk and milk products. The horizontal analysis concerned the years 2000–2017 in terms of the entire EU, and the vertical ones of individual EU countries in the years 2015–2017. According to the terms of the United Nations Commodity Trade Statistics Database (comtrade.un.org), the data aggregation concerned:

- milk and cream and products other than butter or cheese;
- butter and other fats and oils derived from milk;
- cheese and curd.

The data was presented in the form of a value (EUR) and the harmonized indices of consumer prices (HICP) published by Eurostat comparability have been adjusted.

RESULTS

Trade of milk and dairy products on the intra-EU market has been developing dynamically for many years. In 2000, aggregate imports accounted for over 13 million t and were lower than the aggregated exports, which amounted to nearly 14 million t. The constant increase in international trade resulted in the fact that in 2017, imports between EU countries increased in relation to 2000 by nearly 77% to over 23 million t and were higher than exports, which increased by almost 58% to 22 million t. It should be noted that the systematic growth of these indicators indicates an increase in the importance of this agri-food industry in the EU market. This is evidenced by the share in intra-EU imports and exports, which also show a growing tendency. In 2000, the first indicator was less than 0.97% and the second 0.96%. In turn, in 2017, the import of milk and dairy products on the intra-EU market increased to around 1.2% of the total import volume, and exports to 1.15% of total exports. This is the result of integration to the European Union of new member states which created the export and import increases [Braja and Sawicka 2017] – Figure 1.

In the analyzed period of time, large fluctuations can be observed in the relation of exports to imports. In the years 2000–2001, exports were higher than imports by 4.7% and nearly 8%. In the next two years, imports exceeded exports. The change from 2001 to 2002 is particularly noticeable from 7.7% to –4.7% and in 2003 to –2.26%. However, since 2002, a growing trend in the relation of exports and imports has been observed. In the period from 2004 to 2014, the volume of intra-EU exports over imports was observed. In turn, in 2015–2017 a strong downward trend and an increase in the surplus of imports over exports of milk and dairy products on the EU's internal markets is noticeable (Fig. 1).

Intra-EU trade in milk and its products in terms of space is characterized by high heterogeneity. This is indicated by the coefficient of variation, which in 2015 amounted to (136.4%), for imports (138%) in 2016 and in 2017 the rate increased to 141.7%. In turn, for exports, an increase in concentration is observed (with a large variation) because the analyzed ratio drops. In 2015 it was 140.6%, in 2016 – 145%, to fall to 130.3% in 2017.

For many years, the largest importer of milk in the EU internal market was Germany (in 2017 – 5,280.00 thousand t of milk and milk products), despite the fact that this country is the largest producer of milk in the EU. In Italy, imports (2,688.51 thousand t) account for only 50% of Germany's level. Similarly, Belgium (2,607.02 thousand t) and the Netherlands (2,541.74 thousand t) are major buyers. In turn, France (1,615.42 thousand t) and the United Kingdom (1,451.71 thousand t) imported about 70% less than Germany. On the other hand, the smallest imports in 2017 were recorded in Cyprus (31.57 thousand t), Malta (33.48 thousand t)

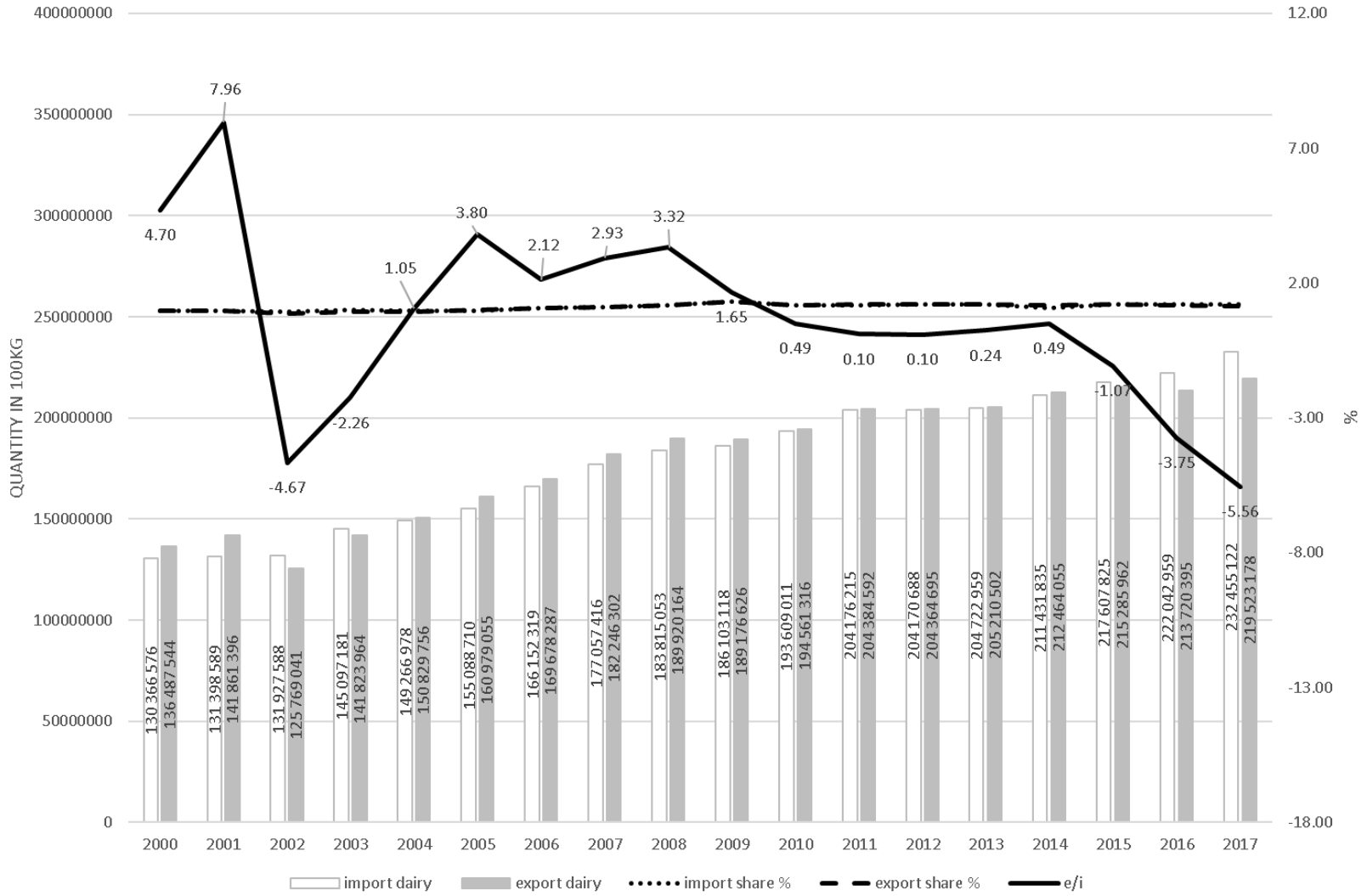

Fig. 1. Intra-EU volume of imports and exports, balance of trade and share of imports and exports of milk and dairy products in total EU intra-EU trade in 2000–2017 (100 kg)

Source: Own elaboration on the basis of Eurostat data.

and Estonia (47.74 thousand t) – Table 1. These are very small countries.

According to Eurostat data, the largest increase in imports of milk and milk products between EU countries in 2016–2017 was recorded in Estonia, which grew 83%. In the next three countries, the imports increased less and fluctuated around 20%. They were Slovakia (21.48%), Ireland (21.20%), and Malta (19.88%). In turn, such countries as the Czech Republic (–13.96), Luxembourg (–13.47%), Portugal (–9.82%) and Italy (–9.12%) showed a significant decrease in imports in the discussed period (Table 1).

When analyzing the intra-EU exports of milk and dairy products, it should be noted that Germany dominates with 4,826.10 thousand t in 2017. France is the second country (2,262.76 thousand t), with approximately 47% of Germany's export volume. It was similar to the Netherlands, where the export volume was 2,219.77 thousand t. In Belgium the level was 1,827.64 thousand t, which was equal to approximately 38% of the largest exporter level. On the other hand, the smallest volume of exports of milk and its products was recorded in Malta (2.12 thousand t), Cyprus (22.26 thousand t) and Croatia (27.40 thousand t) – Table 1.

The largest increase in intra-EU exports in 2016–2017 can be observed on Malta (302,071.43%) which is puzzling and may result from erroneous data rather than from actual increase. Another country where a significant overgrowth of this indicator was noted was Bulgaria with an increase of 312.28% in sales of milk and processed products to other EU countries. In subsequent countries, the growth of exports is less spectacular. In Greece, exports increased in 2017 compared to 2016 by almost 50%. In turn, in Poland, the increase in this indicator was around 37%, in Italy 35%, and in Portugal over 31%.

When analyzing the data, it can be noticed that the countries with decreases in exports of milk and its products during the discussed period were Finland (–15.81%), Ireland (–15.36%), France (–10.01%) and Germany (–9.78%). This group shows countries that dominate in the production and volume of trade in milk and milk products within the EU.

Trade balance is a very important indicator, which makes it possible to monitor competitiveness in a given industry, which is important for entities operating on a given market [Begg et al. 2014]. The highest positive balance of trade in intra-EU milk and its products in 2017 has been achieved by Poland (765.596 thousand t in 2017), the Czech Republic (732.9 thousand t), France (647.3 thousand t), Austria (603.6 thousand t) and Denmark (505.7 thousand t). In turn, the largest deficit in the trade balance in 2017 has been achieved by Italy (–1,649.9 thousand t). The next country with the highest negative balance in the intra-EU trade is Belgium, where the value of this measure was almost 53% lower than in Italy and amounted to –779.38 thousand t. In Ireland, exports of milk and milk products were lower than imports by 489.08 thousand t. The leader in intra-EU trade is Germany, and it has also a deficit of 453.25 thousand t. A country where it is possible to observe an equally high loss in intra-EU trade was Spain, where imports were higher than exports by 439.96 thousand t (Table 1).

Intensive adaptation by the dairy sector to the production requirements and consumer preferences affects the growth of competitiveness in international markets. That is why for many years the value of intra-EU trade in milk and its products has been characterized by dynamic growth. In the period from 2000 to 2017 revenues from imports and exports in the EU market increased threefold. At the beginning of the discussed period, the value of imported milk and dairy products in the EU accounted for almost EUR 12.5 billion, and exports only EUR 12.3 billion. In turn, in 2017, the revenues from imports amounted to almost EUR 37 billion, however, they were lower than the value of exports of products by EUR 55.7 million. In the analyzed period negative changes have been observed. The drop in the value of intra-EU trade in the products is noticeable in 2009, 2015 and 2016, which may result from the release of the milk quota and the increase in the supply of raw material and its products. It resulted in a decline in prices and lowering revenues (Fig. 2).

The share of the value of both imports and exports of milk and dairy products as compared to the aggregate revenues in intra-EU trade has fluctuated around 1% for years. However, the share of income from imports of dairy products in a given EU country is higher than the value of exports. In 2000, imports accounted for 0.96% of total imports, and exports 0.91%. In the

Table 1. Intra-EU exports and imports of milk and dairy products in the years 2015–2017 and growth

EU Countries	Total imports (thousand t)				Total exports (thousand t)					
	2015	2016	2017	changes 2017/2016 (%)	2015	2016	2017	changes 2017/2016 (%)	balance 2016	balance 2017
Austria	395.18	448.65	453.67	1.12	1 173.42	1 044.08	1 057.23	1.26	595.42	603.56
Belgium	2 238.25	2 388.57	2 607.02	9.15	1 926.24	1 826.21	1 827.64	0.08	–562.36	–779.38
Bulgaria	131.90	153.43	148.49	–3.22	42.51	40.03	165.02	312.28	–113.40	16.53
Croatia	211.35	237.99	243.10	2.15	16.34	22.59	27.40	21.27	–215.40	–215.70
Cyprus	29.79	32.14	31.57	–1.76	13.58	17.71	22.26	25.68	–14.43	–9.31
Czech Republic	301.83	321.63	276.74	–13.96	1 025.46	1 002.87	1 009.59	0.67	681.24	732.86
Denmark	280.25	276.03	314.45	13.92	634.00	637.98	820.16	28.56	361.95	505.71
Estonia	33.54	26.00	47.74	83.60	239.13	274.20	311.71	13.68	248.20	263.97
Finland	154.30	143.52	136.29	–5.04	140.55	136.09	114.57	–15.81	–7.43	–21.72
France	1 742.95	1 642.27	1 615.42	–1.63	2 715.09	2 514.52	2 262.76	–10.01	872.25	647.34
Germany	4 375.22	4 652.32	5 279.35	13.48	5 218.04	5 349.03	4 826.10	–9.78	696.71	–453.25
Greece	440.14	446.21	464.19	4.03	130.15	134.92	202.01	49.73	–311.30	–262.18
Hungary	248.18	237.35	245.02	3.23	484.15	406.32	430.60	5.98	168.97	185.58
Ireland	779.54	769.92	933.18	21.20	556.82	524.69	444.10	–15.36	–245.23	–489.08
Italy	3 226.09	2 958.46	2 688.51	–9.12	812.96	770.67	1 038.65	34.77	–2 187.80	–1 649.85
Latvia	115.17	154.75	157.04	1.48	343.32	347.53	376.46	8.32	192.78	219.41
Lithuania	433.50	434.66	506.75	16.58	317.23	314.93	300.33	–4.64	–119.73	–206.41
Luxembourg	162.02	123.82	107.14	–13.47	340.60	343.67	359.73	4.67	219.85	252.59
Malta	30.77	27.93	33.48	19.88	–	0.00	2.12	302 071.43	–27.93	–31.36
Netherlands	2 138.54	2 489.24	2 541.74	2.11	1 774.61	2 143.26	2 219.77	3.57	–345.98	–321.97
Poland	536.84	619.09	602.66	–2.65	988.65	999.59	1 368.25	36.88	380.50	765.59
Portugal	375.10	356.75	321.71	–9.82	237.33	160.75	211.31	31.46	–196.01	–110.39
Romania	275.70	343.34	381.21	11.03	74.92	80.37	104.09	29.51	–262.97	–277.12
Slovakia	259.19	243.19	295.43	21.48	331.18	277.66	269.04	–3.10	34.47	–26.39
Slovenia	105.01	98.41	97.11	–1.32	309.39	329.99	324.82	–1.57	231.58	227.71
Spain	1 005.75	868.45	900.35	3.67	481.52	490.63	460.39	–6.16	–377.82	–439.96
Sweden	387.03	375.56	364.46	–2.96	142.41	160.11	153.94	–3.86	–215.44	–210.52
United Kingdom	1 347.65	1 334.62	1 451.71	8.77	1 059.01	1 021.67	1 242.30	21.60	–312.96	–209.41

Source: Own elaboration on the basis of Eurostat.

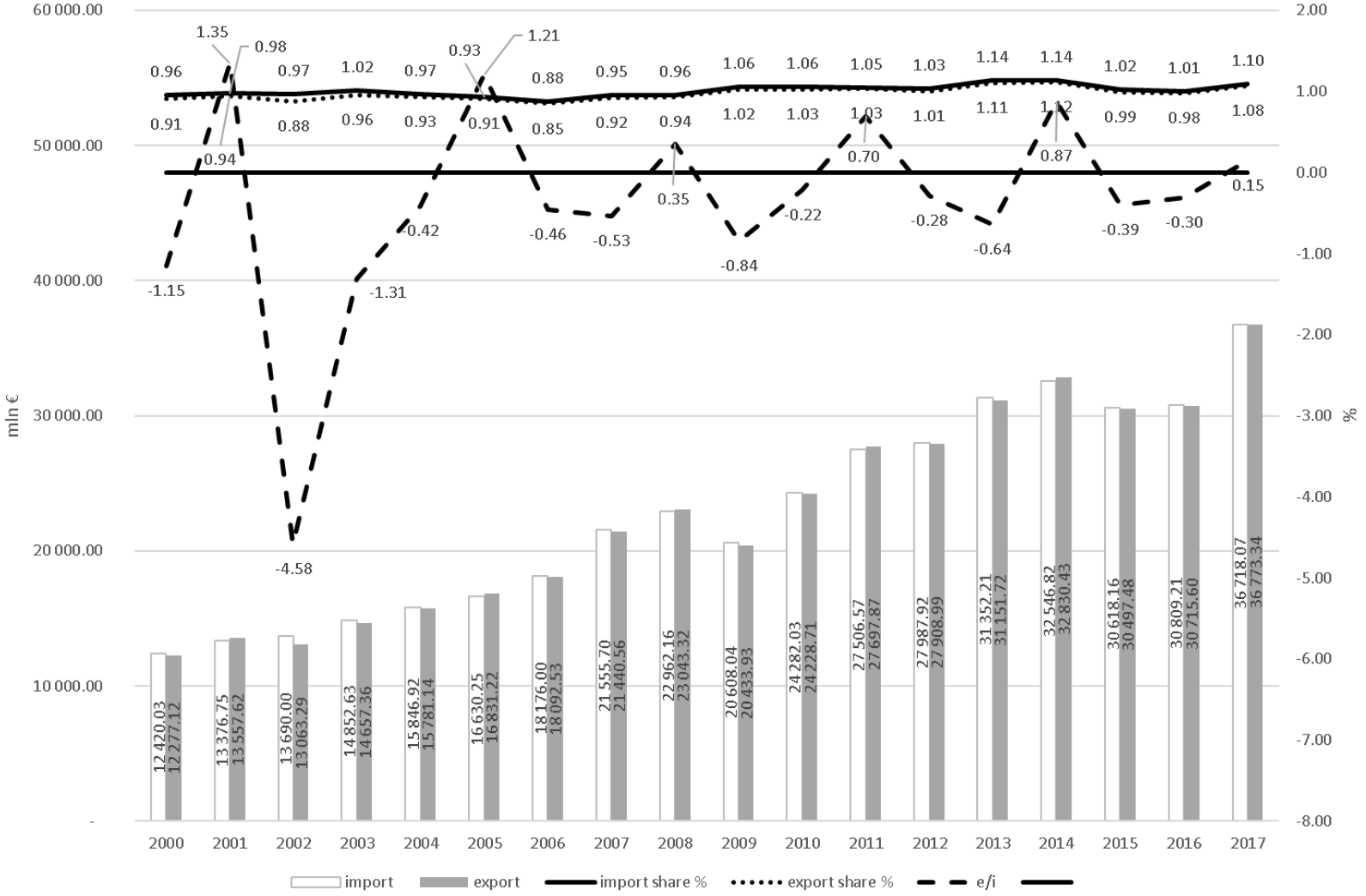

Fig. 2. Intra-EU value of imports and exports, balance of trade and share of imports and exports of milk and dairy products in total EU intra-EU trade in 2000–2017 (fixed prices 2015)

Source: Own elaboration on the basis of Eurostat.

period up to 2017 there were slight fluctuations resulting from various reasons (described earlier).

During the analyzed period, there is a large variation in the ratio of export revenues to the value of imports. In 2000, over a 1% deficit can be observed in intra-EU trade. But the next year there was a surplus of exports over imports. However, already in 2002, this index was the lowest and amounted to –4.58%. In the next three years, exports eradicated the negative difference in 2005 to reach a surplus of 1.21% (accession of new states). In subsequent years there were alternating periodic fluctuations in the level of the discussed indicator. At the end of the analyzed period, the value of exports in 2015 and 2016 was lower than imports, however, already in 2017 there was an increase and the surplus reached 0.15%.

Revenues from intra-EU trade in milk and its products, like the volume of turnover, are distinguished by spatial differentiation. The coefficients of import variation in the years 2015–2017 oscillate around 126% or 129%, which indicate very high heterogeneity. Exports are even more diversified (VC = 147% or 144%).

Comparably as in the case of the turnover volume, the highest value of imports on the discussed market in 2017 was recorded in the countries that are leaders, i.e.: Germany (EUR 6.9 billion), France (EUR 3.8 billion), Belgium (EUR 3.7 billion), the Netherlands (EUR 3.7 billion), Italy (EUR 3.6 billion), and the United Kingdom (EUR 3.4 billion). On the other hand, Malta's revenues from imports of milk and dairy products (EUR 0.05 billion) were less than 1% of those of Germany. The next lowest importing countries were Estonia (EUR 0.07 billion), Cyprus (EUR 0.09 billion), Latvia (EUR 0.16 billion), and Slovenia (EUR 0.18 billion) – Table 2.

In most of the EU countries, the value of international turnover in the milk market increases year by year (the exception is Malta). The largest increase in imports in 2016–2017 was recorded by Lithuania (almost 52%), followed by Estonia (almost 32.7%), and the smallest Finland (4.7%) and Portugal (6.9%) – Table 2.

The situation was similar in the case of exports. The highest export revenues in intra-EU trade can be observed among the leaders of the milk and dairy products market – Germany (EUR 7.7 billion), the Netherlands (EUR 6 billion), France (EUR 4.4 billion), Belgium (EUR 3.2 billion) and Italy (EUR 2.5 billion). In turn, the smallest value of sales to other EU countries, to the level of exports was in Malta, which amounted to only EUR 2,100. However, Croatia already recorded revenues from exports of milk and its products at the level of EUR 39 million. In Bulgaria, the value of exports was already more than twice as high and amounted to almost EUR 88 million. Among the countries with the lowest level of revenues from sales to other EU countries was Romania with a level of almost EUR 100 million – Table 2.

The largest increases in exports in 2016–2017 were recorded in Latvia (51.8%), Poland (43.7%), Lithuania (36.8%), Ireland (36.8%), Estonia (33.8%) and Hungary (31.1%). On the other hand, Malta stands out again because there was a significant drop in sales to other countries, by more than 65% in the described period. On the other hand, France reported an increase in sales revenue to other EU countries at a mere 4.6%. In countries such as Bulgaria and Greece, the level of this indicator was also small, 6.9% and 8.8% – Table 2.

When analyzing the value of the trade balance in the EU's internal market, the biggest surplus was in 2016–2017, the Netherlands (EUR 2.2 billion), Ireland (EUR 1 billion), Denmark (EUR 0.98 billion), Germany (EUR 0.8 billion) and Poland (EUR 0.75 billion). In turn, the largest deficit in the discussed market was achieved by the United Kingdom (nearly EUR 2 billion), Italy (EUR 1.2 billion), Spain (EUR 0.91 billion), Sweden (EUR 0.78 billion) – Table 2.

The most important economic factor of the market, apart from the demand and supply, is price per unit revenue. In the intra-EU trade of milk and dairy products in the analyzed period, the 1 kg export price was much less diversified in terms of space than imports (Fig. 3). The coefficient of variation for exports was about 35%, which indicates the average heterogeneity of prices of milk and its products. However, the value of the discussed index for imports oscillated around 76%, which indicates a large variation in prices (high level of index for exports in 2016 results from outlier observed values) on Malta, after exclusion of the Malta variable, the coefficient of variation amounted to 77.5%, which nevertheless indicates the high heterogeneity this year).

Table 2. The value of intra-EU exports and imports of milk and dairy products in the years 2015–2017 and growth

EU countries	Total imports (million EUR)				Total exports (million EUR)					
	2015	2016	2017	changes 2017/2016 (%)	2015	2016	2017	changes 2017/2016 (%)	balance 2016	balance 2017
Austria	748	775	868	12.01	1 037	976	1 114	14.09	201	246
Belgium	2 880	3 045	3 780	24.17	2 523	2 663	3 226	21.13	–381	–555
Bulgaria	178	188	224	19.24	90	82	87	6.88	–106	–137
Croatia	163	180	226	25.75	24	32	39	21.65	–148	–187
Cyprus	77	77	86	11.71	87	112	137	22.63	35	52
Czech Republic	524	543	619	14.12	586	562	690	22.71	20	71
Denmark	555	536	619	15.53	1 317	1 376	1 599	16.22	840	980
Estonia	58	55	73	32.67	133	137	183	33.75	82	110
Finland	388	367	384	4.69	246	230	262	14.05	–137	–122
France	3 071	3 077	3 842	24.86	4 453	4 193	4 387	4.64	1 116	546
Germany	5 522	5 604	6 900	23.12	6 688	6 553	7 694	17.40	949	794
Greece	727	727	835	14.89	480	516	561	8.80	–211	–274
Hungary	321	344	410	19.14	276	267	350	31.13	–77	–60
Ireland	678	592	765	29.11	1 359	1 291	1 766	36.79	699	1 001
Italy	3 421	3 227	3 640	12.80	2 040	2 149	2 466	14.76	–1 078	–1 174
Latvia	117	128	157	22.55	142	146	221	51.81	18	64
Lithuania	185	184	279	51.96	319	347	475	36.83	163	195
Luxembourg	363	309	339	9.81	395	336	405	20.47	27	66
Malta	48	49	53	9.25	0.0003	0.0060	0.0021	–65.74	–49	–53
Netherlands	2 766	3 067	3 735	21.78	4 201	4 749	5 971	25.73	1 682	2 236
Poland	754	846	962	13.70	1 186	1 190	1 710	43.71	343	747
Portugal	541	528	565	6.92	199	179	207	15.36	–349	–358
Romania	304	383	479	25.15	81	82	99	21.39	–301	–380
Slovakia	320	327	404	23.43	250	227	267	18.05	–101	–137
Slovenia	152	152	181	18.89	139	143	177	24.04	–9	–3
Spain	1 685	1 631	1 879	15.26	836	847	965	13.92	–783	–914
Sweden	878	891	1 021	14.58	213	213	240	12.51	–678	–781
United Kingdom	3 195	3 019	3 438	13.87	1 197	1 147	1 463	27.63	–1 873	–1 975

Sources: Own elaboration on the basis of Eurostat.

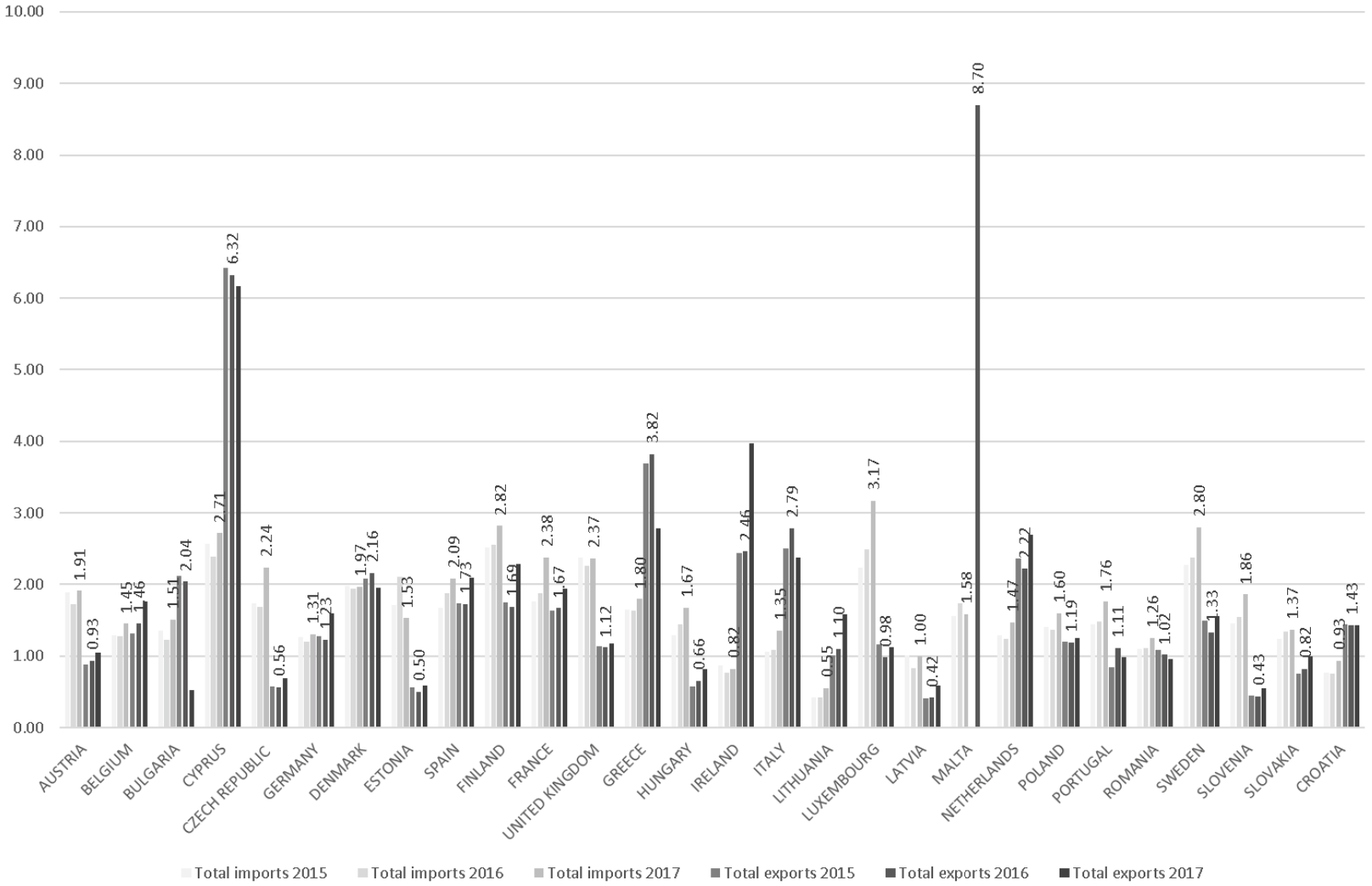

Fig. 3. Price of 1 kg of milk and milk products (EUR) imported and exported on the EU's internal market in 2015–2017 in EU countries and descriptive statistics

Source: Own elaboration based on Eurostat.

The highest import prices of 1 kg of milk and dairy products in 2017 were recorded in Luxembourg (EUR 3.2). The average price in the range of EUR 2–3 can be observed in such countries as Finland, Sweden, Cyprus, France, the United Kingdom, the Czech Republic. In turn, the lowest unit revenue (below EUR 1) was recorded in Latvia, Croatia, Ireland and Lithuania.

In the case of export prices in 2017, the highest values were obtained in Cyprus (over EUR 6) and Ireland (almost EUR 4). In countries such as Greece, the Netherlands, Italy, Finland and Spain, income per unit ranged from EUR 2 to EUR 3. Unit revenues from imports of milk and dairy products below EUR 1 were in Slovakia, Portugal, Romania, Hungary, the Czech Republic, Estonia, Latvia, Slovenia, Bulgaria, Malta.

CONCLUSIONS AND IMPLICATIONS FOR POLICY

In recent years, due to the emergence of various types of negative factors (even after the abolition of milk production quotas, the situation on the European market depends on global trends), the dairy sector faced a serious crisis. This was the result of a dramatic fall in prices in both EU Member States and in most other parts of the world. Therefore, the dynamics of change is diversified, and intra-EU trade becomes one of the most important elements of the milk and dairy products market. This is mainly due to the fact that most of the raw material and products are sold on the Community market, and only 10% goes outside the EU. This balances the demand for dairy products in domestic markets, although demand is already saturated in many Member States [Chatellier 2017].

Despite negative factors, intra-EU trade in milk and its products is characterized by constant growth. In 2017, the volume of imports between EU countries increased in relation to 2000 by nearly 77% to over 23 million t and was higher than exports, which increased by almost 58% to 22 million t. At the same time, the share in intra-EU aggregated imports and exports also shows an upward trend. Imports of milk and dairy products on the intra-EU market amount to around 1.2% of the total import volume, and exports to 1.15%. At the same time, in the period from 2000 to 2017, revenues from imports (EUR 36.71 billion) and exports (EUR 36.77 billion) increased threefold despite large spatial variation.

For many years, Germany has been the largest importer and exporter of milk in the EU internal market. At the same time, Germany is the largest milk producer in the EU. However, this country in 2017 had a trade deficit in milk and dairy products. In addition to Germany, Italy, Belgium, the Netherlands, France, and the United Kingdom have a significant influence on intra-EU trade. Despite this, the largest deficits in international turnover can be observed among these countries. On the other hand, Malta, Cyprus, Croatia, Estonia, Latvia, Slovenia were among the smallest participants in the intra-EU market.

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REFERENCES

Begg, D., Vernasca, G., Fischer, S., Dornbusch, R. (2014). Economics. McGraw-Hill Education, New York.

Benedek, Z., Bakucs, Z., Fałkowski, J., Fertő, I. (2017). Intra-European Union trade of dairy products: insights from network analysis. Studies in Agricultural Economics, 119, 91–97.

Bórawski, P., Dunn, J. W. (2015). Differentiation of milk production in the EU countries in the aspect of Common Agricultural Policy. Roczniki Naukowe SERiA,17 (2), 9–15.

Braja, M., Sawicka, J. (2017). Competitive advantages of Polish food producers on the European Union market in the post-accession period. Acta Sci. Pol. Oeconomia, 16 (2), 13–22.

Chatellier, V. (2017). International, European and French trade in dairy products: trends and competitive dynamics. Working Paper SMART – LERECO 17-05. Nantes. Retrieved from https://hal.archives-ouvertes.fr/hal-01581619/document [accessed 13.01.2019].

European Dairy Association – EDA (2018). Economic Report 2017/18. Brussel. Retrieved from http://eda.euromilk.org/fileadmin/user_upload/Public_Documents/Facts_and_Figures/EDA_Economic_Report_2017.pdf [accessed 13.01.2019].

Eurostat. International trade in goods. Database. Retrieved from https://ec.europa.eu/eurostat/web/international-trade-in-goods/data/database [accessed 13.01.2019].

Gołębiewski, J. (2018). Economic performance of sectors along the food supply chain – comparative study of the European Union countries. Acta Sci. Pol. Oeconomia, 17 (4), 69–78.

Parzonko, A. (2009). Stan i kierunki zmian w produkcji mleka na świecie [The state and the tendencies of changes in production of milk in the world]. Roczniki Nauk Rolniczych, G, 96, 16–26.

Pawlak, K. (2013). Zmiany w polskim handlu zagranicznym produktami rolno-spożywczymi po akcesji do Unii Europejskiej [Changes in Polish foreign trade in agri-food products after accession to the European Union]. Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego, 14 (2), 170–184.

Pietrzak, M., Roman, M. (2018). The problem of geographical delimination of agri-food merkets: evidence from the butter market in European Union. Acta Sci. Pol. Oeconomia, 17 (3), 85–95.

Stańko, S. (2006). Tendencje w produkcji, konsumpcji i handlu zagranicznym na rynku mleka i jego artykułów w latach 1990–2005 [Tendencies in production, consumption and Polish foreign trade in milk and dairy products in years 1990–2005]. Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego, 15, 357–368

Szajner, P. (Ed.) (2018). Rynek mleka. Stan i Perspektywy [Milk market. State and Perspectives], 54/55.

Török, A., Jāmbor, A. (2013). Agri-food trade of the New Member States since the EU accession. AGRIC.ECON-Czech, 59, 3, 101-112.

Westhoek, H., Rood, G., Berg, M., Van den, Janse, J., Nijdam, D., Reudink, M. and Stehfest, E. (2011). The Protein Puzzle: The consumption and production of meat, dairy and fish in the European Union. European Journal of Food Research & Review, 1 (3), 124–144.

HANDEL WEWNĄTRZUNIJNY MLEKIEM I PRODUKTAMI MLECZARSKIMI

STRESZCZENIE

W pracy analizie poddano handel wewnątrzunijny mlekiem i produktami mleczarskimi w latach 1998–2017. Analizie poddano wolumen wewnątrzunijnego import i eksport, saldo bilansu handlowego oraz udział importu i eksportu mlekiem i produktami mleczarskimi w handlu wewnątrzunijnym ogółem w Unii Europejskiej w latach 2000–2017. Ponadto podano cenę (EUR) 1 kg mleka i przetworów mlecznych importu i eksportu w obrocie wewnątrzunijnym w latach 2015–2017 w krajach UE. W pracy zastosowano metody tabelaryczne, graficzne oraz statystykę opisową. W latach 2004–20014 roku wielkość eksportu wewnątrzunijnego przeważała nad importem. Z kolei w latach 2015–2017 zauważalny jest wyraźny trend spadkowy oraz wzrost nadwyżki importu nad eksportem mleka i produktów mlecznych na rynkach wewnętrznych UE.

Słowa kluczowe: mleko, produkty mleczne, eksport, import, saldo

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THE REDISTRIBUTION FUNCTION IN POLAND'S AGRICULTURAL BUDGETS IN THE LONG TERM

Andrzej Czyżewski[1] ✉, Ryszard Kata[2] ✉, Anna Matuszczak[3] ✉

[1] University of Zielona Góra
[2] University of Rzeszów
[3] Poznań University of Economics and Business

ABSTRACT

The study specifies the premises and purposes of the redistribution function of budget expenditures on agriculture. It determines the amount of expenditures fulfilling these purposes in Poland's agricultural budgets in 1995–2018. An attempt was also made to assess their effects in the context of the dynamics of farmers' income, the disparity between farmers' income and the incomes of other social and professional groups, as well as intrasectoral disproportion in farm household income. It was demonstrated that the increase of budget expenditures on agriculture in 2004 contributed to a real increase of farmers' income and a decrease in the disparity between the income of farm households and the income of households in general and of working households. However, the increase of redistribution expenditures did not reverse the progressing process of farm household income polarisation.

Key words: agricultural budget, redistribution function, disposable income, farm
JEL codes: E62, H50, Q14, Q18

INTRODUCTION

Considerable amounts of funds are directed to the agricultural sector in Poland from the budget of the European Union (EU) within the framework of the Common Agricultural Policy (CAP) and from the national budget, with part of the funds from the national budget constituting an integral element of CAP instruments. These funds are part of public expenditures through which the state fulfils specific purposes with reference to the agricultural sector, and they are related to the functions of the fiscal policy, i.e. the allocation function, the redistribution function, and the stabilisation function [Buchanan and Musgrave 1999, Owsiak 2006]. Fulfilment of the purposes of the redistribution function is oriented at agricultural income.

The turnabout in the EU's agricultural policy in the 1980s and the 1990s towards increased financial support of agricultural income was related to the income disparity between agricultural producers and people employed outside the agricultural sector deepening in the process of industrialisation of the economy [Poczta-Wajda 2017]. This happened in spite of the increase in agricultural productivity and labour productivity in this sector. Within the last three decades, successive CAP reforms have reduced funds for market-price interventions in favour of support for rural areas and environmentally friendly functions of agriculture, yet farmers' income still remains the focus of the CAP.

The support received by agricultural producers in the EU is sometimes perceived as an example of political rent, and activities undertaken by well-organ-

Andrzej Czyżewski https://orcid.org/0000-0002-6233-6824; Ryszard Kata https://orcid.org/0000-0001-6085-3935;
Anna Matuszczak https://orcid.org/0000-0002-5045-5447
✉kmigz@ue.poznan.pl; rdkata@univ.rzeszow.pl; anna.matuszczak@ue.poznan.pl

ised farmer interest groups – as a manifestation of rent-seeking [Tullock 1967, Kruger 1974]. Farmers' income in the EU is largely, sometimes even mostly, the result of political decisions and the financial support received [EC 2017]. The issue has been widely criticised. Some researchers argue that political rent is related to inefficient allocation of resources, distortion of market incentives, and unjustified benefits for selected social groups at the expense of others [Buchanan et al. 1980, Lee and Tollison 2011, Aligicia and Tarko 2014]. However, according to B. Czyżewski and Matuszczak [2016], the concept of political rent is not entirely adequate for the assessment of the agricultural policy. Subsidies constitute payment for public goods (activities for landscape, biodiversity, rural culture, tradition, etc.) or compensation for the imperfection of the market mechanism leading to the "drainage of economic rent from agriculture". Considering the above, only some of the subsidies, remaining after the amount compensating for market deficiencies and the payment for the public goods delivered is subtracted, meet the criteria of (pure) political rent.

Two facts should be mentioned among the reasons for budget support for agriculture:

1. On account of food production (i.e. quantitative and qualitative food security), "management" of the ecosystem by farmers with the current and future generations in mind, and the provision of social and cultural goods [Wilkin 2010, Zegar 2012, B. Czyżewski 2016], agriculture is too important a sector of the economy for contemporary developed society to be able to afford its marginalisation.
2. The profitability of agricultural activity is lower than that of non-agricultural activity due to the features of agricultural production (length of the production cycle resulting from biological characteristics, production dependent on climatic factors, etc.) and the features of land and labour resources involved in agriculture [cf. Czyżewski 2007]. This is evidenced by the so-called cash conversion cycle occurring in every type of business activity. It measures how many days are needed for the cash going through successive production stages and changing into other assets (materials, production in progress, ready product, amount due) to be converted back into cash again. In the case of non-agricultural manufacturing companies, such cycle usually takes 60 days [Mądra-Sawicka 2014], in the case of commercial companies – about 30 days, and in agriculture – a year on average (excluding the so-called special branches of agricultural production). A shorter cycle makes it possible to increase the number of working capital turnover cycles, which leads to an increase in the profitability of the given business activity. It is therefore impossible for income obtained from basic agricultural production to equal income from other sectors of production or services. Solutions for farmers include strong concentration and intensification of production, increasing its scale, and shortening – as far as possible biologically – the production cycle to the maximum extent (i.e. using solutions typical of industrial agriculture) or abandoning farming in favour of different economic activity. Both these solutions are disadvantageous to taxpayers and consumers. This is why they agree to transfer part of their income – through budget redistribution – towards farmers in order to decrease their income disparity and keep them in agricultural production. At the same time, subsidies for farmers involve the requirement to apply the cross-compliance mechanism.
3. The study specifies the purposes of the redistribution function of budget expenditures on agriculture and determines the volume of expenditures on the fulfilment of these purposes in Poland's agricultural budgets in the years 1995–2018. Moreover, an attempt was made at assessing the effects of these expenditures with reference to farmer household income. The relationship between budget expenditures on agriculture in Poland and the level of intersectoral disparity in farmers' income and inequalities in farm household income was analysed. In order to determine the interdependence between these two variables, linear correlation analysis and regression analysis was used. It was assumed that an increase in budget expenditures on agriculture, in particular of redistribution expenditures, should lead to a decrease in the disparity in farmers' income and a reduction of the income gap in the sector.
4. The relatively long temporal scope of the research, including the years 1995–2018, made it possible

to analyse the level of redistribution expenditures from the agricultural budget and their effects in the pre-accession period (1995–2003) and after Poland joined the EU (2004–2018). On account of the availability of data on income, the analysis of the interdependence between budget expenditures and agricultural income covers the years 1995–2017. The research included the following income categories: (i) average real per capita disposable income within a farmers' household; (ii) gross real disposable income in individual farms in agriculture; (iii) real disposable income obtained from a farm. The first two categories of income were compared to the income of households in general and of working households. Consumer price index (CPI) was used as a deflator in order to make the income and budget expenditures realistic.

5. The source of empirical materials on budget expenditures on agriculture in the years 1995–2018 was the Ministry of Agriculture and Rural Development. Data on income was obtained from the periodic survey carried out by the Statistics Poland (GUS) entitled *Household budgets* (monthly per capita disposable income) and *Statistical Yearbook of Agriculture* (gross disposable income) for the years 1995–2017 [GUS 1995–2017a, b].

RESEARCH RESULTS AND DISCUSSION

With respect to the previously mentioned reasons, we may distinguish two redistribution purposes of budget expenditures on agriculture [Kulawik 2009, Juszczyk et al. 2016]:

- an increase in the income of farmers' households, thus reducing the disparity in farmers' income compared to other social and professional groups;
- a decrease in the income gap between farms.

By agricultural budget expenditures we mean national public funds and EU funds directed to agriculture (also directly to agricultural producers) and expenditures on rural development, agricultural markets, and support for the Agricultural Social Insurance Fund (ASIF).

It is not easy to attribute budged expenditures to a specific fiscal function, as they often affect different social and economic processes at the same time. The fundamental purpose of the redistribution function is to support farmers' income. Some expenditures, e.g. direct subsidies, increase farmers' income directly, whereas others impact it through a reduction of the costs of agricultural production (e.g. subsidies for insurance). Other expenditures contribute to the stabilisation of agricultural income (expenditures on agricultural markets, on countering the effects of natural disasters) or support farm development processes, creation of alternative sources of income, and rural development. These expenditures, though with some delay, may also increase farmers' income through the effects of investments.

Considering the above, we applied two types of approach in our research:

- we treat all the expenditures from the agricultural budget as funds directly or indirectly affecting agricultural income;
- we isolate the expenditures whose fundamental purpose is to support agricultural income within a short time (we will call these redistribution expenditures).

Among the expenditures on agriculture from the national budget, the subsidy to ASIF constitutes the largest amount. In the pre-accession period (1995–2003), the average amount of the subsidy was PLN 12.3 billion – it increased consistently from PLN 6.2 billion to nearly PLN 16 billion. This kind of increase of the subsidy to ASIF became necessary in view of the long-term, deepening income inefficiency of farms. In the years 2004–2018, the annual average budget support for ASIF amounted to PLN 16.3 billion (ranging from PLN 14.5 billion to 18.2 billion). In the years 1995–2003, the subsidy to ASIF constituted 73.5% of Poland's agricultural budget on average, whereas in the post-accession period (2004–2018), as a result of covering agriculture and rural areas with support from CAP instruments, the share in the total agricultural budget (including EU funds) decreased to an average of 37%. The lowest share was recorded in the years 2011–2015 (31.6% on average).

The degree of self-funding of the system of social insurance of farmers in Poland is 21–26%, which means that the state subsidises this insurance to the extent of 74–79% [Podstawka 2016]. The situation is similar in other EU countries (including Germany and

France), but the share of subsidies to this system in Poland is higher by several percentage points [Czyżewski 2016]. A substantial part of the subsidies to ASIF are subsidies to contributions, thanks to which these contributions can be considerably lower than if they were to fully cover the needs of the system. Moreover, part of the subsidies are subsidies to retirement benefits. In the authors' opinion, both these parts fulfil the purposes of the redistribution function. It is worth mentioning that in the period of transformation of the Polish economy (in the 1990s), the benefits paid out by ASIF provided subsistence to many farmer families. Also later, these benefits constituted a substantial percentage of income in an average farm household. In 2005, in 27.1% of farmer households, pension and retirement benefits constitutes more than 50% of the total family income. In 2016, there were considerably fewer such farm households, i.e. 13.6%, with 1/3 of farm households obtaining income from pension and retirement benefits [GUS 2006, 2017]. In 2005, income from pension and retirement benefits constituted 13.7% in the structure of disposable income of farm households. In the subsequent years, this share consistently decreased, reaching the level of 11.8% in the years 2010–2017. However, it is still a significant item in the structure of farm family income.

A turning point for the change both in the general level of budget expenditures on agriculture and the structure of these expenditures was Poland's accession to the EU in 2004 and the implementation of CAP instruments. Already in 2004, agricultural budget expenditures were nominally almost three times higher than in 1995 and in real terms, they were higher by nearly 30% (Table 1). In the subsequent years, primarily due to EU funds, but also the national contribution to the CAP, the agricultural budget kept

Table 1. Expenditures from Poland's agricultural budget (national and EU funds) in 1995–2018

Year	National agricultural budget		EU funds[a]	Total (national and EU funds)	Dynamics, year 2004 = 100		Agricultural budget State budget (%)
	agriculture, rural areas, agricultural markets	ASIF			nominal	real (2016 prices)	
1995	2 404.5	6 269.1	–	8 673.6	34.4	70.2	9.51
1997	3 042.5	9 826.2	–	12 868.7	51.0	75.5	10.07
1999	3 126.7	13 750.3	–	16 877.0	66.9	82.6	11.88
2001	5 552.7	15 836.8	1 131.1	22 520.6	89.3	94.9	12.36
2003	5 937.3	15 617.9	1 508.4	23 063.6	91.4	94.6	11.92
2004	7 673.1	15 607.6	1 951.7	25 232.4	100.0	100.0	14.45
2006	8 379.1	14 968.8	10 927.4	34 275.4	135.8	131.7	15.31
2008	19 616.9	15 771.4	14 928.3	50 316.5	199.4	181.1	16.21
2010	12 901.4	16 187.8	15 993.4	45 082.7	178.7	152.8	14.97
2012	11 571.6	15 856.3	21 265.4	48 693.3	193.0	152.6	14.81
2014	10 818.2	16 698.6	26 150.0	53 666.9	212.7	166.6	16.53
2016	8 402.1	18 238.9	26 653.2	53 294.1	211.2	168.0	14.46
2018	9 310.4	17 936.4	21 492.2	48 739.0	193.2	156.1	12.27

Since 2010, formal EU funds have been excluded from the national budget and included in the European Funds Budget (EFB). In the table, EU funds, also for the earlier period (2000–2009), were isolated from the national budget.

Source: Ministry of Agriculture and Rural Development data based on the implementation of budget acts from the years 1995––2018.

growing very rapidly and in 2009, it was nominally almost 6 times higher compared to 1995 (by 161.3% in real terms). In the period that followed, certain degree of stabilisation of the agricultural budget at the level of PLN 53–55 billion could be observed, with some one-year decreases to the level slightly above PLN 48 billion (in 2012 and in 2017–2018). In general, in the post-accession period, the total agricultural budget (national and EU funds) was higher on average by 176% nominally and by 88.4% in real terms compared to the average level from the pre-accession period.

When it comes to redistribution expenditures from the national budget, apart from a considerable fixed amount of subsidies to ASIF, the remaining instruments were more or less permanent in nature (Table 2). Subsidies for agricultural fuel (reimbursement of excise tax on fuel) – which have been in effect since 2006 and in the years 2006–2018 amounted to PLN 716 million on average – constituted quite a significant element among these instruments. Another rather important, though changeable element among budget expenditures are subsidies for crop and farm animal insurance, also in effect since 2006. Subsidies for qualified

Table 2. Expenditures from the agricultural budget fulfilling redistribution purposes in 1995–2018

Detailed division	Expenditures in the years	Expenditures per annum (bracket; average)
National budget (apart from contribution to CAP)		
Subsidy to ASIF	1995–2018	PLN 6.3–18.2 billion; avg. PLN 14.8 billion
Subsidies for agricultural fuel	2006–2018	PLN 650–895 million; avg. PLN 716 million
Subsidies for qualified seed material	2007–2017	PLN 19.4–119.8 million; avg. PLN 84.5 million
Subsidies for crop and farm animal insurance[a]	2006–2018	PLN 80–802 million; avg. PLN 261 million
Subsidies for calcium fertilisers	1996–2004	PLN 20–201 million; avg. PLN 80 million
Subsidies for "Extra" class milk	1995–2003	avg. PLN 69.2 million
Expenditures within the framework of the CAP, financed from EU funds and the national budget (contribution)		
Direct subsidies	2004–2018	PLN 6.3–14.8 billion; avg. PLN 11.8 billion
Support for less favoured areas (LFA)	2004–2018	PLN 1 145–1 361 million; avg. PLN 1 325 million
Agri-environmental payments[b]	2004–2018	PLN 170–1 535 million; avg. PLN 795 million
Afforestation of agricultural land, improvement of forest viability	2004–2018	avg. PLN 120 million
Support for semi-subsistence farms (RDP 2004–2006)	2004–2010	avg. PLN 304.3 million
Other: quality systems, advisory services	2007–2018	avg. PLN 15.5 million
Redistribution expenditures/CAP expenditures in total	2004–2018	66.5%
Redistribution expenditures in the national budget in total[c] including:	1995–2018	67.7% [6.7% excluding ASIF]
– in the pre-accession period	1995–2003	77.0% [5.0% excluding ASIF]
– in the post-accession period	2004–2018	61.7% [7.7% excluding ASIF]

[a]Excluding the amounts paid out in the case of crop damage due to draught, flooding, etc.
[b]Including climate payments and eco-friendly farming in the RDP 2014–2020.
[c] Without including the national contribution to CAP instruments.

Source: Own calculations based on Ministry of Agriculture and Rural Development data and Agency for Restructuring and Modernisation of Agriculture statistics.

seed material functioned in the agricultural budget for a relatively long time (2007–2017), and in the pre-accession period, subsidies for calcium fertilisers and "Extra" class milk were also available.

In the pre-accession period (1995–2003), redistribution expenditures ranged from PLN 6.4 billion to 16.2 billion nominally, with the majority constituting subsidies to ASIF (Fig. 1). Their share in the agricultural budget was 75.2% on average, ranging from 68.6% to 81.9%. If we exclude subsidies to ASIF, the remaining redistribution expenditures constituted only 0.4–2.2% of the agricultural budget (Fig. 2) – with the average amount PLN 179 million.

Since 2004, mainly due to EU funds, a clear "rebound" has been recorded in the form of permanent real increase in redistribution expenditures (Table 1, Fig. 1). In 2004, their share in the total agricultural budget reached a record level of 93.5% (Fig. 2). This resulted from the fact that the introduction of CAP instruments oriented at agricultural development (e.g. activities sup-

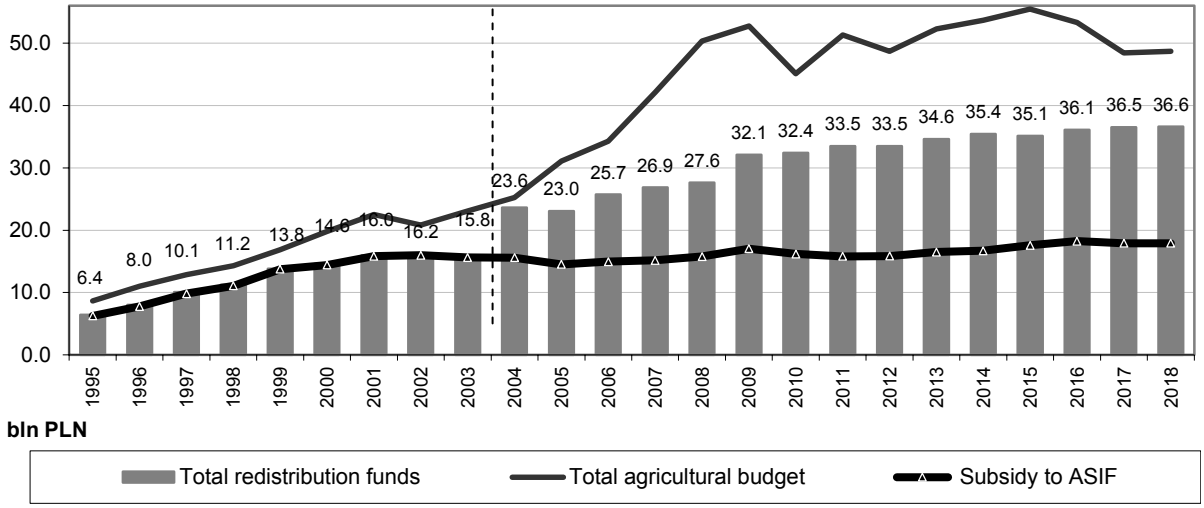

Fig. 1. Redistribution expenditures in the light of the total agricultural budget in 1995–2018

Source: Own calculations based on Ministry of Agriculture and Rural Development and Agency for Restructuring and Modernisation of Agriculture data.

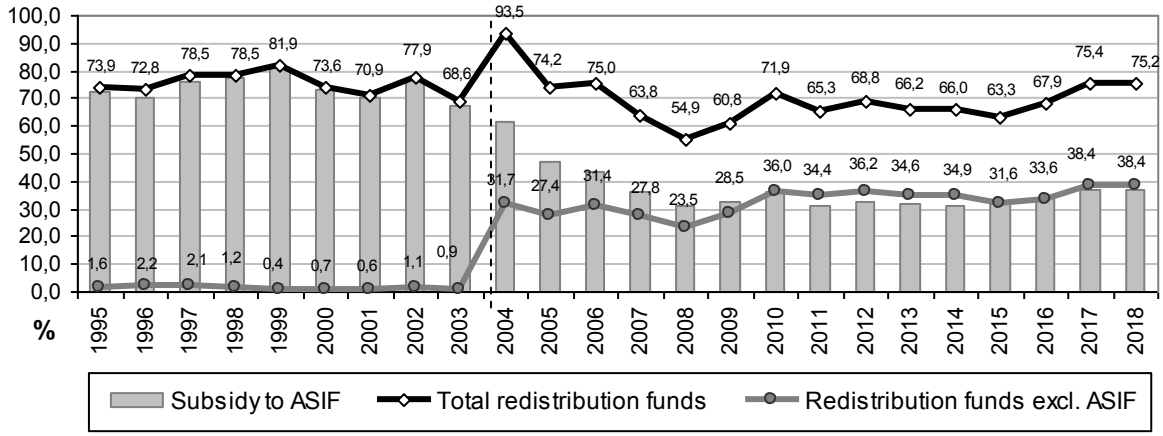

Fig. 2. Share of redistribution expenditures in the total agricultural budget in 1995–2018

Source: Own calculations based on Ministry of Agriculture and Rural Development and Agency for Restructuring and Modernisation of Agriculture data.

porting investments) was delayed relative to the moment in which the funds directly supporting agricultural income were made available. In 2004, strictly national expenditures, almost entirely dedicated to the redistribution function (subsidies to ASIF) accumulated with CAP expenditures which supported farmers' income. In the subsequent years after accession, we can see, however, that the considerable nominal increase in redistribution expenditures (Fig. 1) was accompanied by a decrease in their share in Poland's agricultural budget to the level of just under 55% in 2008 (Fig. 2). Apart from social and income-related purposes, budget transfers to agriculture increasingly supported the purposes of the allocation and stabilisation functions in agriculture. In the years 2009–2018, the share of redistribution expenditures in the total agricultural budget ranged from 60.8% to 75.4% (Fig. 2). After Polish agriculture was covered by CAP instruments, the volume of total redistribution expenditures increased to an average level of PLN 31 billion per annum (ranging between PLN 23.1 billion and 36.6 billion). This means that in the post-accession period, these expenditures constituted 2.5 times the average from the years 1995–2003 and were higher by 72% in real terms. The scale of the increase of redistribution expenditures is reflected by a different value. If we take into consideration redistribution expenditures excluding subsidies to ASIF, the annual average amount of this type of expenditures in the post-accession period was 52 times higher in real terms than the average amount of this type of expenditures in the years 1995–2003. Thanks to the CAP, in 2004, the agricultural sector gained funds directly supporting farm household income. This kind of support was basically non-existent in the pre-accession period (Table 2).

It should be emphasised that the set of CAP instruments includes certain mechanisms of intrasectoral redistribution. When it comes to the financial perspective 2014–2020, the so-called redistribution (additional) payment, available in Poland since 2015, to which farms with the surface area ranging from 3.01 ha to 30 ha of AL are entitled, should be mentioned here. A limit for subsidies per farm up to the amount of EUR 150,000 applies.

In order to determine the direction and strength of the connections between agricultural budget expenditures and farmer household income, statistical analysis was used. At first, the values of the Pearson (linear) correlation coefficient between three variables X_i illustrating budget expenditures on agriculture (Table 3) and two variables Y_{1-2} describing the income of farmer households and income obtained from a farm

Table 3. Pearson (linear) correlation coefficients between budget expenditures on agriculture (X_i) in billion PLN (as fixed prices) and the variables describing agricultural income (Y_i)

Detailed division	X_1 total agricultural budget	Redistribution expenditures	
		X_2 in total	X_3 excl. ASIF
Y_1 – real per capita disposable income in farmer households (PLN)	0.7672*	0.7742*	0.8298*
Y_2 – real gross disposable farm income in the individual farm sector (billion PLN)	0.7579*	0.7759*	0.8609*
Y_3 – income gap between the per capita disposable income of farmers and employed persons (%)[a]	–0.3773	–0.3943	–0.4623*
Y_4 – indicator WP_{LD} with reference to households in general	0.4886*	0.5312*	0.5626*
Y_5 – indicator WP_{LD} with reference to working households	0.4817*	0.5512*	0.5656*
Y_6 – diversity of per capita disposable income in farmer households – Gini coefficient	0.8942*	0.8591*	0.8507*

*Correlation coefficients are significant when $p < 0.05$; $N = 23$ (years 1995–2017).
[a]Statistical significance of the correlation for variable X_{3t-1}, i.e. for expenditures from the preceding year.
Source: Own calculations based on Statistics Poland data.

(Table 3). All the categories of income and expenditures were considered based on fixed prices. Moreover, the correlation between the X_i characteristics and the variable describing the income gap between farmers and employed persons (Y_3) with respect to per capita disposable income was examined. With reference to gross disposable income, in turn, the value of the authors' original indicator of progress in reducing the income gap (WP_{LD}) between the income of farmer households and the income of households in general (Y_4), as well as the income of employed persons (Y_5) was calculated.

The last dependent variable is the Gini coefficient describing the diversity of farm households in terms of per capita disposable income (Y_6). The indicator of progress in reducing the income gap (for year t) was expressed using the following formula:

$$WP_{LDt} = \frac{D_{Rt}}{D_{Rt-1}} : \frac{D_{Nt}}{D_{Nt-1}}$$

where:

D_{Rt}/D_{Rt-1} – change (year/year) in the gross disposable income of farmers;

D_{Nt}/D_{Nt-1} – change (year/year) in the gross disposable income in the reference population.

If the value of the progress indicator (WP_{LD}) in the given year was [0 > 1], it means that the income gap between individual farmer households and households in general (or working households) increased, and if the value was higher than 1, it means that the income gap decreased.

The correlation of variables X_i with the disposable income of farmer households (Y_1) and the disposable farm income (Y_2) is positive and high, and the highest correlation indicators were recorded for redistribution expenditures excluding subsidies to ASIF (X_3). Positive correlation indicators of moderate strength also apply to the relationship between the variables describing budget expenditures and the indicators of progress in reducing the income gap of farmers (Y_4 and Y_5). The correlation with the Gini coefficient (Y_6) describing the diversity of income in farmer households is also positive and demonstrates a rather high value (Table 3). For the variable describing the income gap of farmers compared to employed persons (Y_3), statistically significant negative correlation was determined with reference to variable X_3, but with the use of a one-year delay in redistribution expenditures. In order to determine the cause-and-effect relationships between the analysed variables, the regression function was used. It order to estimate it, variable X_3 (redistribution expenditures excluding ASIF) was selected due to the fact that this characteristic demonstrated the strongest correlation with the dependent variables. Moreover, this characteristic best represents the income-oriented purposes of the agricultural budget.

Based on the augmented Dickey–Fuller (ADF) stationarity test, it was established that all the analysed characteristics are non-stationary ($p > 0.1$), which was taken into consideration in the estimation of the regression function, i.e. it was examined in what way the increases of variable X_3 (redistribution expenditures) influence the change (increases) of dependent variable Y_i. Estimations were carried out in two variants for variable X_3, i.e.: X_{3t} – i.e. redistribution expenditures considered for the same year as the values of variable Y_i; X_{3t-1} – expenditures for the year preceding the year for which the values of variable Y_i were determined.

Thus the estimations of the regression function using the method of least squares have the following forms:

$$\Delta Y_{i,t} = ao + a_1 \Delta X_{3t} + \varepsilon \quad (1)$$

$$\Delta Y_{i,t} = ao + a_1 \Delta X_{3t-1} + \varepsilon \quad (2)$$

Regression analysis (Table 4) confirmed the positive relationship between the redistribution expenditures on agriculture and the disposable income of farm households (Y_1), as well as farmers' disposable income obtained from a farm (Y_2). The demonstrated relationships occur with the values of the characteristics determined for the same year, which means that an increase in redistribution expenditures translates directly into an increase in agricultural income. The fit of the regression function to the variables representing the income level is not high, which is not surprising considering the fact that agricultural income is determined by a number of endogenous and exogenous characteristics for farms. A statistically significant

Table 4. Parameters of the regression function describing the influence of redistribution expenditures excluding ASIF (X_3) on farmers' income in absolute and relative terms and on the diversity of that income

Parameter	Y_1 per capita disposable income	Y_2 income from a farm	Y_3 income gap	Y_4	Y_5	Y_6 Gini coefficient for farmers' income
				WP_{LD} in relation to households:		
				in general	working	
	Function no					
	1	1	2	1	1	1
ao	5.969 (26.78)	0.127 (0.529)	0.466 (1.761)	−0.001 (0.016)	–0.0024 (0.015)	0.004 (0.004)
a_1	0.015* (0.007)	0.00045** (0.0001)	–0.0012** (0.0003)	0.000006* (0.00002)	0.000009** (0.000002)	0.000001 (0.00002)
R^2	0.053	0.156	0.089	0.023	0.054	0.003
F (p)	0.046	0.00001	0.0009	0.014	0.0006	0.728
White (p)	0.541	0.413	0.761	0.732	0.755	0.143
Normality (p)	0.784	0.504	0.296	0.001	0.016	0.09
*LM*1	0.107	0.802	0.481	0.653	0.516	0.579

Statistical significance: **$p < 0.001$; *$p < 0.05$; resistant standard errors were provided in brackets.

Testing for normality of the distribution of residuals – Doornik–Hansen test; Autocorrelation (*LM*1) – Breusch–Godfrey test.

Source: Own calculations based on Statistics Poland data.

cause-and-effect relationship between redistribution expenditures on agriculture and variable Y_3 was established, but it needs to be noted that the regression model is correct for variable X_{3t-1}, i.e. with a one-year delay. Coefficient a_1 is negative, which indicates that the higher the redistribution expenditures on agriculture, the smaller the income gap between the disposable income of farmers and employed persons. Better parameters of this function for expenditures considered with a one-year delay may indicate that budget expenditures not only increase farmers' income in the given financial year, but also have a certain ability to create agricultural income in the subsequent year. The regression function for variable Y_6 (intrasectoral diversity of income) is not statistically significant, whereas in the case of variables Y_4 and Y_5, the estimated regression functions (for X_{3t}) are statistically significant, but the residuals are not normally distributed, so the functions do not meet the criterion of correctness. Positive values of the statistically significant correlation coefficients and the estimations of the regression function for these variables allow us to carefully conclude that growing redistribution expenditures have a beneficial impact on the reduction of intersectoral income gap of farmers.

CONCLUSIONS

The stream of budget expenditures available to agriculture since 2004 caused a considerable increase in agricultural income compared to the previous years. It is noteworthy that in the years 2004–2009, real redistribution expenditures on agriculture grew more rapidly (on average by 10.5% year on year) than farm income (4.4% y/y). In the years 2010–2017 on the other hand, a reverse situation could be observed, i.e. the annual average real growth rate of expenditures was 1.1%, while the real disposable income of farmers grew by 6.8% on average. It is more clearly visible since 2010 that redistribution expenditures not only directly contributed to the increase in agricultural income, but also affected efficiency-oriented processes

in agriculture, which resulted in further acceleration of agricultural income growth.

The increase of budget expenditures on agriculture as a result of the sector coming under CAP instruments contributed to the decrease in the disparity in the income of farmers compared to other professional groups. In spite of successive reduction in the post-accession period, the income gap of farmers still exists, which constitutes an argument in favour of maintaining redistribution expenditures in the set of instruments of the agricultural policy.

The increase of redistribution expenditures on the agricultural sector after 2004 was accompanied by deepening intrasectoral disproportion in income. However, a cause-and-effect relationship between the Gini coefficient in terms of farmers' disposable income inequalities and the redistribution expenditures on agriculture could not be proved. Moreover, FADN data, as well as research carried out by other authors [Juszczyk et al. 2016] shows that the diversity of family farm income is much greater for income reduced by budget subsidies than for total income. This brings us to a careful conclusion that budget expenditures directed to agriculture are not able to reverse the tendency for farm income polarisation, but moderate that polarisation, which is advantageous to the sustainable development of agriculture.

REFERENCES

Aligicia, D. P., Tarko, V. (2014). Crony Capitalism: Rent Seeking, Institutions and Ideology. Kyklos, 67 (2), 156–176.

Buchanan, J. M., Musgrave, R. A. (1999). Public Finance and Public Choice: Two Contrasting Visions of the State. CESifo Book Series. Massachusetts Institute of Technology, Massachusetts.

Buchanan, J. M., Tollison, R., Tullock, G. (1980). Towards the Theory of Rent-seeking Society. A&M University Press, Texas.

Czyżewski, A. (2007). Makroekonomiczne uwarunkowania rozwoju sektora rolnego [Macroeconomic conditions for the development of the agricultural sector]. [In:] A. Czyżewski (ed.), Uniwersalia polityki rolnej w gospodarce rynkowej [Universals of agricultural policy in a market economy]. Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań.

Czyżewski, A. (2016). KRUS a Państwo w budżetach rolnych Polski w długim okresie, cz. 2 [KRUS and the state in the agricultural budgets of Poland in the long run, Part 2]. Ubezpieczenia w Rolnictwie. Materiały i Studia, 61, 7–22.

Czyżewski, B. (ed.) (2016). Political Rents of European Farmers in the Sustainable Development Paradigm. International, National and Regional Perspective. Wydawnictwo Naukowe PWN, Warszawa.

Czyżewski, B., Matuszczak, A. (2016). Interwencjonizm rolny: pogoń za rentą a wybór publiczny lub korygowanie rynku [Agricultural intervention: chasing the rent and choosing public or adjusting the market]. Ekonomista, 5, 674–726.

European Commission (2017). Share of direct payments and total subsidies in agricultural factor income (2011––15 average). Retrieved from https://ec.europa.eu/agriculture/sites/agriculture/files/cap-post-2013 [accessed 25.02.2019].

Główny Urząd Statystyczny (2006). Charakterystyka gospodarstw rolnych w 2005 r. [2005 Characteristics of agricultural holdings]. Warszawa.

Główny Urząd Statystyczny (2017). Charakterystyka gospodarstw rolnych w 2016 r. [2016 Characteristics of agricultural holdings]. Warszawa.

Główny Urząd Statystyczny (1995–2017a). Budżety gospodarstw domowych. Dane za lata 1995–2017 [Household budget survey. Data of 1995–2017]. Warszawa.

Główny Urząd Statystyczny (1995–2017b). Rocznik Statystyczny Rolnictwa. Dane za lata 1995–2017 [Statistical Yearbook of Agriculture. Data of 1995–2017]. Warszawa.

Juszczyk, S., Gołasa, P., Wysokiński, M. (2016). Redystrybucyjna rola Wspólnej Polityki Rolnej Unii Europejskiej – przesłanki teoretyczne i rezultaty [The redistributive role of the Common Agricultural Policy of the European Union – theoretical premises and results]. Ekonomista, 5, 704–726.

Krueger, A. (1974). The Political Economy of the Rent-Seeking Society. The American Economic Review, 3 (64), 291–203.

Kulawik, J. (2009). Polityka fiskalna i budżetowa a finanse polskiego rolnictwa [Fiscal and budgetary policy and the finances of Polish agriculture]. Zagadnienia Ekonomiki Rolnej, 4 (321), 21–39.

Lee, D. R., Tollison, R. D. (2011). Rent Seeking and Inefficiencies Resulting from Pecuniary Externalities. Kyklos, 64 (4), 579–588.

Mądra-Sawicka, M. (2014). Determinanty cyklu konwersji gotówki w przedsiębiorstwach agrobiznesu [Determinants of the cash conversion cycle in agribusiness enterprises]. Roczniki Naukowe SERiA, 16 (6), 344–349.

Owsiak, S. (2016). Finanse publiczne. Teoria i praktyka [Public finances. Theory and practice]. Wydawnictwo Naukowe PWN, Warszawa.

Poczta-Wajda, A. (2017). Polityka wsparcia rolnictwa a problem deprywacji dochodowej rolników w krajach o różnym poziomie rozwoju [Agricultural support policy and the problem of income deprivation of farmers in countries with different levels of development]. Wydawnictwo Naukowe PWN, Warszawa.

Podstawka, M. (2016). Dlaczego KRUS? [Why KRUS?]. Ubezpieczenia w Rolnictwie. Materiały i Studia, 60, 9–24.

Tullock, G. (1967). The Welfare Costs of Tariffs, Monopolies, and Theft. Western Economic Journal, 3 (5), 224–232.

Wilkin, J. (ed.). (2010). Wielofunkcyjność rolnictwa. Kierunki badań, podstawy metodologiczne i implikacje praktyczne [Multifunctionality of agriculture. Research directions, methodological foundations and practical implications]. IRWiR, Warszawa.

Zegar, J. S. (2012). Współczesne wyzwania rolnictwa [Contemporary agriculture challenges]. Wydawnictwo Naukowe PWN, Warszawa.

FUNKCJA REDYSTRYBUCYJNA W BUDŻETACH ROLNYCH POLSKI W DŁUGIM OKRESIE

STRESZCZENIE

W opracowaniu określono przesłanki i cele funkcji redystrybucyjnej wydatków budżetowych na rolnictwo oraz ustalono wielkość wydatków, dzięki którym można było zrealizować te cele w budżetach rolnych Polski w latach 1995–2018. Podjęto także próbę oceny ich efektów w kontekście dynamiki dochodów rolników, dysparytetu dochodów rolników względem innych grup społeczno-zawodowych, a także wewnątrzsektorowych dysproporcji dochodowych gospodarstw rolniczych. Wykazano, że zwiększenie wydatków budżetowych na rolnictwo od 2004 roku przyczyniło się do realnego wzrostu dochodów rolników oraz zmniejszenia dysparytetu dochodowego gospodarstw rolniczych względem gospodarstw domowych ogółem i pracowniczych. Wzrost wydatków redystrybucyjnych nie odwrócił jednakże postępującego procesu polaryzacji dochodowej gospodarstw rolniczych.

Słowa kluczowe: budżet rolny, funkcja redystrybucyjna, dochód rozporządzalny, gospodarstwo rolne

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THE LEVEL OF INVESTMENT IN FARMS IN EUROPEAN UNION COUNTRIES

Joanna Kisielińska✉

Warsaw University of Life Sciences – SGGW

ABSTRACT

The aim of the study presented in the paper was to assess the level of investment in farms in European Union countries. The assessment applied the reproduction rate, fixed-asset reproduction rate and the investment rate. Studies were performed for all farms and farms divided into classes according to economic size (KS6 classification). The study covered years 2007–2016. As significant changes were observed in individual years, the study period was divided into two equal sub-periods, for which average values of the ratios were determined. The studies showed that the level of investment in farms as taken jointly for all EU countries is not enough to reproduce their assets in both sub-periods. What needs to be positively assessed is the fact that the values of all indicators grow as the economic size of farms grows. The level of reproduction and multiplication of property in Polish farms is lower than the EU average for economically weaker farms, but it is usually higher for the stronger ones.

Key words: investments of farms, FADN, asset reproduction

JEL codes: Q14

INTRODUCTION

When assessing the situation of farms, what needs to be taken into account is not only the current situation, but also the future one. Development is a direct consequence of made investments, serving not only to restore the assets, but also to multiply it.

Investing by economic entities requires own or foreign financial means. The accession of Poland to the EU allowed farms to have access to EU funds. In years 2004–2016, as part of direct payments, over PLN 144 billion was paid out to Polish farmers[1]. It had an effect not only on the level of life of farmers, but also on the conditions of production and its development. The inflow of funds certainly makes farms take investment decisions, particularly so as there are additional payments for the investing activity.

Kulawik [2014] pays attention to the impact of subsidies on the investment decisions taken by EU agricultural producers. He notes that by allowing to considerably reduce the cost of capital, the subsidies can be an incentive to increase production capacities of farms through the use of newer technologies, modernisation of the machine park and expansion of farmland area. On the other hand, he claims that if subsidies do not result in shifting to

[1] The Agency for Restructuring and Modernisation of Agriculture (ARiMR) database. Retrieved form http://www.arimr.gov.pl/pomoc-unijna/wdrazane-programy-i-dzialania-dane-liczbowe/zrealizowane-platnosci-obszarowe.html [accessed 12.2018].

Joanna Kisielińska https://orcid.org/0000-0003-3289-1525
✉joanna_kisielinska@sggw.pl

new technologies, they "weaken the motivation of farmers to improve competitiveness and take entrepreneurial actions and investments" [Kulawik 2014, p. 105]. Despite this, there is no doubt that subsidies have an effect on increase in the income of farmers and that their share in farming income is considerable. It might be suspected that if a market was opened to foreign farming products, a lot of weaker farms would not be able not only to invest, but even to pursue further activity.

Józwiak [2012] writes about the meaning of investment in farming. He points out that it is the investments that indicate the competitiveness of farms, apart from the obtained income. This is so as they indicate the willingness and the skill of the entity to adapt to the changing environment, which is a condition for maintaining competitiveness in the long run. Supporting investments with EU funds has a direct effect on the implementation of innovation in farms.

Gołębiewska [2010] provides the following as investing goals: introduction of new technologies, improvement in production quality, differentiation of agricultural activity or adaptation of agricultural production to the requirements of environment protection. She draws attention to the fact that the factors having an impact on investment decisions may be both internal and external. The conducted studies show that the entities with the highest participation in expenses for investment purposes were farms with stronger ties with the surroundings.

Investigations by Grzelak [2012] indicate a significant effect of general economic conditions on the reproduction processes. The scale of production is also an important factor. Economically strong farms usually showed extended reproduction, economically weaker ones – a narrowed one.

The aim of the studies presented in the paper is to compare the level of investment conducted by farms in EU countries, taking into account their economic size. The study covered years 2007–2016. The scope of study was limited to commercial farms. According to FADN methodology, they cover farms achieving standard production of over EUR 2,000[2]. In 2016, they were 52% of all farms, but they manufacture nearly 82% of farming production[3]. The other farms (often referred to as welfare farms), are 48% of all farms, but their share in agricultural production is only 18%. Due to the low value of production, their owners usually generate income from other sources [Sikorska 2003, Józwiak et al. 2018]. According to Kołoszko-Chomentowska and Sieczko [2014, p. 104]: "farms without the capacity to commercial production and reproduction of potential are not farming components, but welfare entities".

MATERIAL AND METHODS

The assessment of the level of investment in farms usually uses three indicators being a relation of investment to depreciation ($W1$), investment to fixed assets ($W2$) and investment to farming income ($W3$). The said indicators are named variously in the literature, they are also different in economic categories used to determine them.

The $W1$ indicator is referred to as the reproduction indicator [Grzelak 2012, Grzelak 2014, Ryś-Jurek 2014, Grzelak 2015], fixed-asset reproduction rate [Józwik 2012], investment rate [Kulawik 2014] or asset reproduction indicator [Wasilewska 2009]. The $W2$ indicator is a relation of gross investment to fixed assets [Grzelak 2012], fixed-asset restoration indicator [Grzelak 2014, Ryś-Jurek 2014], fixed-asset reproduction rate [Wasilewska 2009, Jóźwik 2012]. The $W3$ indicator is referred to as the relation of investment to income [Grzelak 2012, Ryś-Jurek 2014] or investment rate [Grzelak 2014].

To determine the indicators, gross investments, gross investments without land or net investments are used. Some authors include all fixed assets in the $W2$ indicator, others reduce it by the value of land. The indicators determined for various categories differ not only in values, but also in their interpretation.

In this paper, the indicators were determined in the following manner:

[2] The manner of determination of standard output (SO) is presented, among others, by Goraj et al. [2012].

[3] These values were calculated according to Statistics Poland (GUS) and FADN values.

$$W1 = \frac{gross\ investments}{depreciation} \cdot 100\% \quad (1)$$

$$W2 = \frac{net\ investments}{fixed\ assets} \cdot 100\% \quad (2)$$

$$W3 = \frac{gross\ investments}{agricultural\ income} \cdot 100\% \quad (3)$$

The $W1$ indicator will be referred in this paper as the reproduction indicator. To determine it, gross investments not adjusted by the value of purchased land were used because land purchases were not defined in the FADN base – investments are entered jointly. It distorts the interpretation of this indicator to some extent as land is not depreciated. Studies by Grzelak [2015] indicate that land purchases prevailed in the farms with a low value of reproduction indicator (calculated for gross investments without land). The $W1$ indicator calculated according to formula (1) cannot be interpreted as a measurement of asset reproduction. Values higher than 100% do not guarantee the reproduction of fixed assets if land was a significant item in the investment. The $W1$ indicator can assume negative values if gross investments are negative. Such a situation will occurs when the sold assets exceed the purchased and produced one (including the breeding livestock). It usually means the lack of vistas for the farms and inclination to their liquidation.

The $W2$ indicator (fixed-asset reproduction rate) is information about the degree of multiplication of assets (along with land). Positive values mean that farms increase the possessed assets. As the numerator of the $W2$ indicator include net investments (gross investments minus depreciation), the indicator will be negative in the cases where the $W1$ indicator is lower than 100. As a result, the interpretation of the sign of that indicator is analogous to the interpretation of the $W1$ indicator (whether it is higher or lower than 100%).

In the case when investments are pursued from own funds of farms, the $W3$ indicator (investment rate) shows what part of their income is allocated to development. If external financing sources are also used, the $W3$ indicator shows proportions between investments and income. It must be added that in some instances the interpretation of the $W3$ indicator may be difficult. Such a situation will occur when gross investments or farming income are lower than 0. The $W3$indicator is then lower than 0 and the interpretation depends on what category is negative. If both gross investments and farming income are lower than 0, the $W3$ indicator is positive and its value may be misleading.

The average values of the indicators were calculated for all farms from the FADN base and for classes determined according to the economic size according to the ES6 classification[4]. Individual classes were determined in the following manner:

- K1 – very small farms, economic size in thousand EUR $\in$ [2; 8);
- K2 – small farms, economic size in thousand EUR $\in$ [8; 25);
- K3 – medium-small farms, economic size in thousand EUR $\in$ [25; 50);
- K4 – medium-large farms, economic size in thousand EUR $\in$ [50; 100);
- K5 – large farms, economic size in thousand EUR $\in$ [100; 500);
- K6 – very large farms, economic size from EUR 500,000 upwards.

RESULTS AND DISCUSSION

The studies used data from 2007 and 2016, coming from commercial farms from EU-28 member states, included in the FADN base. The studies included the Great Britain despite the planned exit from the EU and Croatia, which until 2013 had not been a member of the EU.

The three indicators were calculated for all years and all farms and with division into classes. It turned out that there is quite a variability in them over years, which results in comparison between countries giving various assessments depending on the year of the analysis. As a result, the data were aggregated, determining average values of the $W1$ and $W2$ indicators

[4] Standard values for 2015 obtained for farms participating in the Polish FADN [IERiGŻ-PIB 2016].

for two five-year sub-periods[5]: from 2007 to 2011 and from 2012 to 2016[6]. In the *W*3 indicator, both the numerator and the denominator are data in the form of a time series of periods, which allows aggregation by way of determining the sum. Therefore, in both sub-periods gross investments and farming income were summed up and then their quotient was calculated.

When assessing the levels of the indicators in various countries and economic classes, it must be remembered that between the countries and classes there are huge differences as regards the level of equipping the farms with fixed assets or as regards their incomes. These factors surely have an effect on the inclination to undertake investment efforts. The indicators allow to assess the investment ability in farms from various perspectives, but they do not explain what their level results from.

Table 1 illustrates average reproduction values (*W*1) for both five-year sub-periods.

In the first sub-period, the values of the indicator lower than 100% were seen in almost all countries of Southern Europe (except for Bulgaria and Slovenia) and in Poland, France and Slovakia. The highest values (above 150%) were seen in nine countries – five highly developed countries of Western Europe (Sweden, Denmark, the Great Britain, Belgium and the Netherlands) and for post-communist ones (Lithuania, Bulgaria, Estonia and Latvia). The average values (from 113 to 149%) were seen in eight countries (three out of which are post-communist countries – the Czech Republic, Slovenia and Hungary).

In the second sub-period, the values of the indicator lower than 100% were seen in most countries of Southern Europe (except for Bulgaria, Malta, Portugal and Slovenia) and Poland and France. Very high (above 150%) values of the indicator were obtained in two highly developed countries of Western Europe (Ireland and Luxembourg) and three post-communist ones (Latvia, Estonia and Lithuania). Average values (from 110% to 150%) were obtained by three post-communist countries (Bulgaria, the Czech Republic and Hungary), four highly developed ones (the Netherlands, Belgium, Sweden and Germany) and Malta. In the six other countries, the *W*1 indicator's value was from 111 to 129% and 101% in Finland.

The average level of the *W*1 indicator in the second sub-period increased in 14 countries and decreased in 13 compared to the first sub-period. The increases and decreases covered various countries, both highly developed and post-communist, and countries from Southern Europe – no principle can be formulated here.

For all EU countries, the average reproduction indicator for the second sub-period was slightly higher than the one determined for the first sub-period, but its low value (slightly higher than 100%) indicates markedly that EU farms are not developing in general. Of course, it does not mean that this conclusion applies to all farms in all countries. What is recommended is an analysis separate for the classes distinguished by economic size.

As mentioned, the average reproduction indicator for all EU farms has a low value both in the first and in the second period, but there is a pronounced upward trend as the economic size expands. In both sub-periods, the average value *W*1 of below 100% is seen in farms from class K1 to class K4 and above 100% – in farms from class K5 and K6. Class K6 has the highest value, although what may be disconcerting is the decrease in the reproduction indicator over time (observed in class K5 as well).

Data from the individual countries indicate that classes K5 and K6 are definitely the leaders in the field of asset reproduction. In the first period, the highest *W*1 indicator was seen in class K6 in 11 countries and in class K5 in nine countries (including Poland). What is interesting is the situation of very small farms (K1) in Estonia and small farms (K2) in Slovakia, where it is them that are the leaders of reproduction in these countries. The values of the *W*1 indicator higher than 100% in all classes can be seen in farms in Bulgaria, Estonia, Lithuania and Latvia and in Austria (which in the FADN base has data about farms in K2–K5 class only).

[5] An equal division of the research period was decided. The research covered a period of only 10 years. Investments should be considered in longer periods to eliminate fluctuations that are observed in individual years.

[6] In the case of Croatia, 2016 was omitted in calculations for all farms because the values of the indicator indicated a data error. Year 2016 was included in the case of the indicators calculated separately for classes.

Table 1. Average reproduction rates in the EU countries – *W*1 index

Country	First sub-period 2007–2011							Second sub-period 2012–2016						
	T.[a]	K1	K2	K3	K4	K5	K6	T.	K1	K2	K3	K4	K5	K6
	%													
Austria	141	–	134	141	148	142	–	128	–	150	106	128	118	–
Belgium	155	–	–	64	131	147	192	138	–	–	–	121	148	140
Bulgaria	193	127	126	241	213	238	196	149	99	111	80	211	135	157
Croatia	–	–	–	–	–	–	–	61	22	27	48	68	130	–
Cyprus	72	60	68	64	104	86	–	62	55	56	17	78	79	–
Czech Republic	122	–	69	105	101	116	135	146	–	83	104	128	154	148
Denmark	193	–	3	132	83	188	249	125	–	29	–63	60	117	148
Estonia	192	273	146	189	184	203	194	165	125	126	108	143	159	159
Finland	120	–	86	96	123	138	82	101	–	72	93	92	120	104
France	93	–	–	79	85	96	104	98	–	98	95	95	100	112
Greece	18	8	14	27	47	10	–	26	21	21	32	46	57	–
Spain	72	29	39	64	88	108	113	72	59	52	63	79	89	93
Netherlands	152	–	–	26	32	178	155	138	–	–	76	–21	168	141
Ireland	114	–48	94	82	94	197	–	167	–	115	118	140	247	–
Lithuania	218	125	242	288	299	249	171	155	190	150	136	151	148	116
Luxembourg	144	–	–	152	106	144	244	155	–	–	54	107	162	203
Latvia	170	107	117	147	160	181	236	190	111	117	128	161	173	241
Malta	57	48	99	163	196	402	–	136	182	–6	138	107	157	–
Germany	127	–	–	76	91	131	149	134	–	–	89	115	125	147
Poland	95	15	58	118	166	193	159	85	21	43	88	125	154	108
Portugal	93	53	78	87	95	142	108	121	85	115	78	125	125	178
Romania	55	20	60	92	89	152	141	44	–7	12	34	60	152	132
Slovakia	92	–	169	154	89	93	90	112	–	–	155	155	118	97
Slovenia	119	74	111	128	171	227	–	111	114	104	99	124	177	–
Sweden	194	–	71	154	183	224	199	136	–	89	52	117	161	132
Hungary	113	8	60	108	112	141	150	136	13	63	128	178	182	151
Great Britain	157	–	91	126	130	159	195	129	–	–20	71	105	124	152
Italy	37	14	28	30	21	59	83	68	43	71	72	62	73	90
Total	104	22	56	84	93	125	153	107	26	65	78	98	119	139

Notes: Empty items mean the lack of data in the FADN base. In the second sub-period, class K3 was omitted in Belgium because data about these farms were only from 2012.

[a]For all households.

In the second period, the highest reproduction indicator in class K6 had 11 countries and in class K5 – as many as 15 countries. The values of the indicator higher than 100% in all classes were seen only in three countries – Estonia, Lithuania and Latvia.

Table 2 illustrates average rates of reproduction of fixed assets (*W*2) for both five-year sub-periods. As mentioned earlier, the interpretation of the sign of the *W*2 indicator is the same as the interpretation of *W*1 going beyond 100%. Therefore, some conclusions resulting from the analysis of the *W*1 indicator still apply.

In the first sub-period, the pronounced leaders as regards the fixed-asset reproduction rate were four post-communist countries: Lithuania, Latvia, Estonia and Bulgaria (*W*2 value above 6.0%). However, taking into consideration low values of the assets of farms in these countries, it cannot be assumed that they will make up for the dissonance as regards highly developed countries. The reproduction rate from 1.1 to 3.7% can be seen in nine developed countries of Western Europe (Sweden, Belgium, Luxembourg, Austria, Denmark, Finland, the Netherlands, the Great Britain and Germany) and the Czech Republic. In other countries, the *W*2 indicator has low values (below 1%) and negative values.

In the second sub-period, the same four countries as in the first sub-period are the leaders in terms of the reproduction rate (*W*2 indicator from 4.4 to 7.8%). The *W*2 indicator from 1.0 to 3.1% is seen is the Czech Republic, Luxembourg, Belgium, Hungary, Slovakia, Germany, Austria, Sweden and the Netherlands. For the other countries, the reproduction rate is low (below 1%) or negative.

The average level of the *W*2 indicator in the second sub-period was higher than in the first one in 12 countries and lower in 15. Similarly to the *W*1 indicator, increases and decreases included various countries.

Let us assume that the value of the *W*2 indicator of above 10% means a very high level and from 5 to 10% – a high level. The very high level in the first sub-period was seen in Lithuania in classes K3, K4 and K5, in Latvia in classes K5 and K6, in Bulgaria in classes K5 and K6 and in Slovakia in classes K2 and K3. In the second sub-period, no country and no class showed such a high reproduction rate. A high level of the *W*2 indicator in the first sub-period in various classes was obtained in 15 cases (11 out of which are post-communist countries) and in the second sub-period – in 11 cases (9 post-communist countries). In nearly all cases (except for two) of high and very high reproduction rates, they were reduced, which means a reduction in the propensity to invest and which might result from the achievement of sufficient equipment with fixed assets.

Table 3 illustrates the average investment rate (*W*3) determined for all farms from the EU countries, with division into classes according to economic size for both sub-periods.

In the first sub-period, the highest values of investment rate were seen in farms from Sweden, the Netherlands and Luxembourg. Moreover, values exceeding 100% were observed in Finland, the Czech Republic, Slovenia, Estonia, Lithuania and Germany. Therefore, five highly developed countries and four post-communist countries are the leaders. The lowest values, below 40%, are observed in farms from seven countries of Southern Europe (Portugal, Cyprus, Romania, Malta, Italy, Spain and Greece). For the other countries, the indicator's value is from 42 to 87%.

In the second sub-period, the highest *W*3 indicator (over 200%) was observed in Slovakia, Estonia and Sweden. *W*3 values exceeding 100% were observed in Luxembourg, Slovenia, Denmark, Finland, Latvia, the Czech Republic, the Netherlands and Germany.

Very low (below 40%) values of *W*3 were seen in the same countries of Southern Europe as in the case of the first sub-period. For the other countries, the indicator's value is from 43 to 98%.

The *W*3 indicator for Poland is lower than the EU average in both sub-periods.

The average level of the *W*3 indicator in the entire EU is 50% and has slightly grown in the second sub-period compared to the first one. The largest change in the value of the indicator (above 20 percentage points) was observed in the following four post-communist countries: Estonia (increase by as many as 137 percentage points), Slovenia, Latvia, Lithuania and Malta. The biggest decrease was observed in the Netherlands (by 67 percentage points). In the other countries, the changes fit within the scope of ±20 percentage points: in most of them, these were slight increases.

Table 2. Average rates of fixed assets in the EU countries – *W*2 index

Country	First sub-period 2007–2011							Second sub-period 2012–2016						
	T.[a]	K1	K2	K3	K4	K5	K6	T.	K1	K2	K3	K4	K5	K6
	%													
Austria	1.9	–	1.5	1.8	2.3	2.2	–	1.4	–	2.2	0.3	1.4	1.0	–
Belgia	3.0	–	–	–1.9	1.4	2.4	6.2	1.9	–	–	–	0.8	2.3	2.5
Bulgaria	6.1	0.9	1.6	7.9	6.8	15.8	11.6	4.4	0.1	0.7	–2.5	7.3	4.6	6.9
Croatia	–	–	–	–	–	–	–	–1.2	–2.1	–2.0	–1.9	–1.3	1.2	—
Cyprus	–0.7	–0.7	–0.8	–1.4	0.4	–0.4	–	–0.9	–0.8	–0.8	–2.1	–0.6	–0.5	–
Czech Republic	1.2	–	–2.4	0.3	0.1	1.1	1.7	3.1	–	–1.2	0.3	2.0	4.2	3.8
Denmark	1.8	–	–1.3	0.4	–0.3	1.5	3.6	0.5	–	–1.2	–2.7	–0.9	0.3	1.1
Estonia	6.4	2.7	1.8	6.4	7.0	9.0	7.2	5.3	0.6	1.4	0.5	3.9	5.3	4.6
Finland	1.5	–	–0.7	–0.3	1.7	3.3	–1.7	0.1	–	–1.5	–0.4	–0.5	1.5	0.3
France	–0.9	–	–	–1.9	–1.6	–0.6	0.6	–0.3	–	–0.3	–0.5	–0.5	0.0	1.7
Greece	–2.9	–3.2	–3.0	–2.7	–2.3	–3.7	–	–2.5	–2.3	–2.6	–2.4	–1.9	–1.5	–
Spain	–0.4	–1.0	–0.9	–0.5	–0.2	0.1	0.3	–0.6	–0.8	–1.1	–0.8	–0.4	–0.2	0.0
Netherlands	1.5	–	–	–1.8	–1.7	1.6	2.6	1.0	–	–	–0.5	–1.7	1.4	1.6
Ireland	0.1	–0.8	0.0	–0.2	–0.1	1.2	–	0.5	–	0.0	0.1	0.3	1.5	–
Lithuania	8.5	1.6	9.5	13.8	14.5	11.8	6.1	5.6	7.0	4.9	3.7	5.7	5.2	1.7
Luxembourg	2.5	–	–	2.3	0.3	2.6	8.7	3.1	–	–	–2.2	0.3	3.6	6.0
Latvia	6.8	–0.2	1.9	5.5	7.7	10.4	10.6	7.8	–0.5	1.3	2.9	7.1	8.3	9.8
Malta	–0.6	–0.6	0.0	0.8	1.2	3.7	–	0.6	1.1	–1.4	0.6	0.2	0.8	–
Germany	1.1	–	–	–0.6	–0.3	1.3	3.5	1.4	–	–	–0.3	0.4	1.0	2.7
Poland	–0.1	–3.2	–1.6	0.8	2.5	3.9	3.4	–0.5	–2.3	–1.8	–0.4	0.8	1.8	0.5
Portugal	–0.3	–1.7	–1.0	–0.7	–0.5	2.0	0.7	0.9	–0.4	0.6	–0.8	1.1	1.0	5.8
Romania	–1.9	–3.1	–1.5	0.7	–0.5	3.8	2.1	–2.6	–4.5	–3.4	–2.3	–2.5	3.6	2.3
Slovakia	–1.5	–	10.5	11.4	–3.3	–1.5	–1.6	1.7	–	–	4.9	7.9	2.8	–0.4
Slovenia	0.7	–0.9	0.3	1.1	3.1	5.4	–	0.5	0.5	0.2	0.0	1.1	3.8	–
Sweden	3.7	–	–0.7	1.7	2.3	5.7	5.5	1.3	–	–0.3	–1.2	0.4	2.5	1.6
Hungary	0.9	–5.2	–2.2	0.4	0.8	3.2	4.8	1.9	–2.2	–1.2	1.0	3.2	4.5	4.3
Great Britain	1.2	–	–0.1	0.4	0.5	1.3	2.9	0.6	–	–1.2	–0.3	0.1	0.5	1.2
Italy	–1.5	–2.6	–1.8	–1.7	–1.9	–0.9	–0.3	–0.6	–1.7	–0.4	–0.4	–0.7	–0.5	–0.2
Total	0.1	–2.3	–1.1	–0.4	–0.2	1.0	2.5	0.3	–2.6	–0.9	–0.6	–0.1	0.7	1.8

Notes: As for Table 1.

Table 3. Average investment rates in the EU countries – *W*3 index

Country	First sub-period 2007–2011							Second sub-period 2012–2016						
	T.[a]	K1	K2	K3	K4	K5	K6	T.	K1	K2	K3	K4	K5	K6
	%													
Austria	77	–	100	79	73	66	–	91	–	244	83	79	63	–
Belgium	81	–	–	33	77	69	127	77	–	–	–	69	73	89
Bulgaria	87	32	47	112	117	128	112	91	34	23	19	79	169	154
Croatia	–	–	–	–	–	–	–	56	31	24	25	27	56	–
Cyprus	24	44	22	19	40	25		25	78	30	14	67	40	–
Czech Republic	129	–	54	58	60	72	252	115	–	55	53	66	74	148
Denmark	$d < 0$	–	66	972	173	$d < 0$	$d < 0$	166	–	405	$i < 0$	85	134	296
Estonia	114	43	52	84	87	128	211	250	55	85	132	137	235	8043
Finland	132	–	218	98	97	156	106	145		933	225	102	129	183
France	72	–	–	65	71	73	73	91	–	20	85	87	94	87
Greece	4	2	3	6	10	2	–	9	10	8	10	12	12	–
Spain	10	7	6	8	10	14	15	12	19	11	11	14	15	12
Netherlands	180	–	–	56	46	137	369	113	–	–	729	$i < 0$	131	122
Ireland	44	$i < 0$	45	32	31	67	–	47	–	37	34	33	53	–
Lithuania	72	55	69	71	80	78	89	97	158	98	69	85	93	107
Luxembourg	179	–	–	4169	132	160	416	187	–	–	107	116	174	263
Latvia	104	42	46	93	107	147	276	140	33	44	80	115	175	296
Malta	11	14	17	31	33	94	–	33	174	$i < 0$	23	14	42	–
Germany	101	–	–	90	65	85	200	100	–	–	83	79	82	158
Poland	42	10	30	45	55	64	93	44	17	30	45	53	54	76
Portugal	30	21	27	28	25	40	37	31	19	27	20	31	33	64
Romania	14	6	11	25	17	41	20	11	$i < 0$	2	4	7	30	33
Slovakia	$d < 0$	–	56	165	180	$d < 0$	$d < 0$	369	–	–	278	181	287	346
Slovenia	123	488	132	101	100	91	–	178	$d < 0$	195	117	133	121	–
Sweden	217	–	94	199	142	202	971	222	–	701	248	179	232	297
Hungary	53	7	22	37	40	67	100	43	5	12	25	34	50	98
Great Britain	78	–	58	93	70	74	92	98	–	$i < 0$	50	92	90	103
Italy	11	7	13	11	7	12	10	15	38	27	21	13	12	10
Total	50	9	21	34	41	62	104	54	13	25	34	43	63	88

Notes: As for Table 1.

$d < 0$ means negative agricultural income, $i < 0$ means negative gross investments.

What is a positive in the situation is the fact that the average investment rate in EU countries grows as the economic size of farms increases, in both sub-periods.

What attracts attention when analysing the level of investment rate in individual classes and countries is its very high values (above 500%) in several cases in class K6 and classes K2 and K3. This results from relatively low income, not exceptionally high investments.

The highest tendency to invest in relation to income in the first sub-period was observed in the farms from the highest class, K6 (in 12 countries), and from class K5 (in 5), but also in the other classes in several cases (from 2 to 3). In the second sub-period as well, the highest investment rates were observed in the largest number of countries in class K6 (in 12), but also in classes K5, K2 and K1 (in 5 countries per class) and in one country in class K3.

The investment rate indicates a propensity of the farm owner to make investment effort. To examine whether there is a linear link between the *W*3 indicator and income from the farm (from five years in total) in individual countries, correlation coefficients were calculated between these characteristics for the two sub-periods.

In the first sub-period, Denmark and Slovakia were excluded because the average income (or rather losses) generated in their farms pronouncedly deviated from the rest and changed to correlation coefficient very much. In the second sub-period, all EU countries were included. In the first sub-period, the correlation coefficient was 0.35; in the second – 0.13. These values show that even though in the first sub-period there was a weak linear link between the level of income and the investment rate, in the second sub-period there was no such link at all [Wasilewska 2009]. Perhaps it would be worthwhile to allocate some EU subsidies for operating activity to investment. In 2016, subsidies for investment activity were merely 2.7% of subsidies for operating activity, and their share in gross investments was only 3.3%[7].

CONCLUSIONS

The most important conclusions to be drawn from the above are as follows:

1. The values of the reproduction indicator (*W*1) and reproduction rates (*W*2) indicate that farms in most countries of Southern Europe (and in Poland and France) do not reproduce the possessed assets. This conclusion applies both to the first (2007–2011) and the second (2012–2016) sub-period. An exception to this are two post-communist countries – Bulgaria and Slovenia (in both sub-periods) and Malta and Portugal (in the second sub-period). A very high and high level of reproduction is observed both in highly developed countries of Western Europe and in post-communist countries. The leaders in the fixed-asset reproduction rate are Lithuania, Latvia, Estonia and Bulgaria.
2. The investment rate (*W*3) in both sub-periods is the lowest in countries of Southern Europe (except for Slovenia and Bulgaria). High values were observed both in some post-communist countries and in highly developed countries. Studies showed that in the second sub-period there is virtually no link between the income generated in the farm and the tendency to invest, measured with the *W*3 indicator, at the level of countries. The link was weak in the first sub-period. As subsidies for investment activity were merely 2.7% of subsidies for operating activity and their share in gross investments was only 3.3% in 2016, perhaps it would be worth increasing the share of subsidies for investments.
3. The highest propensity to invest in both sub-periods was manifested by very large and large farms (usually the three indicators were the highest in these classes).
4. Overall, the investment level for the EU countries is not sufficient to reproduce their assets in both sub-periods under investigation (a slight increase in the value of the *W*1 and *W*2 indicators in the second sub-period does not give grounds for changing that assessment). What is encouraging is only the fact that

[7] Calculated on the basis of 2016 FADN data for all countries on the basis of the value of subsidies for investments (SE406), subsidies for operating activity (SE605) and gross investments (SE516).

the situation is improving along with the growing economic size of farms. Large and very large farms pursue investments at levels allowing their development, which means that their role in the farming production will strengthen in the future.

5. Polish farms invest little compared to other EU countries. It manifested the three considered indicators that were lower than the EU average in both sub-periods. What might be encouraging is only the fact that the economically strongest Polish farms (medium, large and very large) usually exhibited *W*1 and *W*2 indicators that were higher than the average (except for very large farms in the second sub-period). The assessment of investment in relation to income is slightly different. In the first sub-period, the investment rate (*W*3) of very large farms was lower than the EU average in that class; in the second sub-period, the same applied to large farms as well. In lower classes (small and medium farms), the *W*3 indicators were higher than the EU average for these classes in both sub-periods. Despite the fact that these farms allocate considerable funds for investment as regards their income, they usually cannot reproduce the possessed assets (which is manifested by negative values of the *W*2 indicator). In the first sub-period, medium farms managed to do this, and in the second – only medium-large farms. This results from too low income, which must cover the current needs of farming families.

REFERENCES

Agencja Restrukturyzacji i Modernizacji Rolnictwa. Zrealizowane płatności obszarowe. Dane za lata 2004–2019 [Realized area payments. Data for the years 2004–2019]. Retrieved from http://www.arimr.gov.pl/pomoc-unijna/wdrazane-programy-i-dzialania-dane-liczbowe/zrealizowane-platnosci-obszarowe.html [accessed 12.2018].

Farm Accountancy Data Network. Retrieved from http://ec.europa.eu/agriculture/rica/database/database_en.cfm [accessed 12.2018].

Główny Urząd Statystyczny (2018). Rocznik Statystyczny Rzeczpospolitej 2018 [Statistical Yearbook of the Republic of Poland 2018]. Warszawa.

Gołębiewska, B. (2010). Kierunki podejmowanych działań inwestycyjnych w gospodarstwach rolniczych o zróżnicowanych powiązaniach z otoczeniem [Directions of investment activities undertaken in agricultural farms with diversified connections with the environment]. Roczniki Nauk Rolniczych, G, 97 (4), 60–68.

Goraj, L., Osuch, D., Bocian, M., Cholewa, I., Malanowska, B. (2012). Plan wyboru próby gospodarstw rolnych Polskiego FADN od roku obrachunkowego 2013. IERiGŻ-PIB, Warszawa.

Grzelak, A. (2012). Ocena procesów reprodukcji w gospodarstwach rolnych w Polsce po integracji z UE w świetle danych systemu rachunkowości FADN [The plan of selecting the farm sample of the Polish FADN from the financial year 2013]. Journal of Agribusiness and Rural Development, 2 (24), 57–67.

Grzelak, A. (2014). Ocena procesów reprodukcji majątku gospodarstw rolnych prowadzących rachunkowość rolną (FADN) [Evaluation of the processes of reproduction of assets of agricultural holdings conducting agricultural accounting (FADN)]. Zagadnienia Ekonomiki Rolnej, 3, 45–64.

Grzelak, A. (2015). Wybrane czynniki kształtujące procesy reprodukcji majątku gospodarstw rolnych prowadzących rachunkowość rolną (FADN) [Selected factors shaping the processes of reproduction of agricultural holdings conducting agricultural accounting (FADN)]. Journal of Agribusiness and Rural Development, 4 (38), 665–673.

Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej – Państwowy Instytut Badawczy (2018). Wyniki Standardowe 2017 uzyskane przez gospodarstwa rolne uczestniczące w Polskim FADN [2017 Standard Results obtained by agricultural holdings participating in the Polish FADN]. Warszawa.

Józwiak, W. (ed.) (2008). Efektywność funkcjonowania, aktywność inwestycyjna i zdolność konkurencyjna polskich gospodarstw rolnych osób fizycznych [Efficiency of operation, investment activity and competitive ability of Polish farms of natural persons]. IERiGŻ-PIB, Warszawa.

Józwiak, W. (2012). Polskie rolnictwo i gospodarstwa rolne w pierwszej i drugiej dekadzie XXI wieku [Polish agriculture and farms in the first and second decade of the 21st century]. IERiGŻ-PIB, Warszawa.

Józwiak, W., Mirkowska, Z., Ziętara, W. (2018). Rola dużych gospodarstw rolnych we wzroście produktywności pracy rolnictwa polskiego na tle sytuacji w innych wybranych krajach Unii Europejskiej [The role of large farms in the growth of labor productivity in Polish agriculture compared to the situation in other selected European Union countries]. Roczniki Naukowe Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich, 105 (1), 32–46.

Kołoszko-Chomentowska, Z., Sieczko, L. (2014). Gospodarstwo rolne jako podmiot w gospodarce narodowej [An agricultural holding as an entity in the national economy]. Economics and Management, 1, 97–111.

Kulawik, J. (ed.) (2014). Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych (4) [Direct payments and budget subsidies versus finances and functioning of farms and agricultural enterprises (4)]. Publikacje Programu Wieloletniego 2011–2014, 20. IERiGŻ-PIB, Warszawa.

Ryś-Jurek, R. (2014). Wybrane uwarunkowania inwestowania w gospodarstwach rolnych w Unii Europejskiej w latach 2004–2011 [Selected conditions for investing in agricultural holdings in the European Union in 2004–2011]. Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego, 14 (1), 108–118.

Sikorska, A. (2003). Gospodarstwa socjalne w strukturze społeczno-ekonomicznej wsi [Social farms in the socio-economic structure of the village]. IERiGŻ, Warszawa.

Wasilewska, A. (2009). Wyposażenie i efektywność środków trwałych w gospodarstwach indywidualnych o różnych typach produkcyjnych [Equipment and efficiency of fixed assets in individual farms with various types of production]. Zeszyty Naukowe SGGW w Warszawie. Ekonomika i Organizacja Gospodarki Żywnościowej, 78, 223–235.

Wasilewska, E. (2009). Statystyka opisowa od podstaw [Descriptive statistics from scratch]. Wydawnictwo SGGW, Warszawa.

POZIOM INWESTYCJI W GOSPODARSTWACH ROLNICZYCH W KRAJACH UNII EUROPEJSKIEJ

STRESZCZENIE

Celem badań przedstawionych w artykule była ocena poziomu inwestycji w gospodarstwach rolniczych w krajach Unii Europejskiej. Do oceny wykorzystano wskaźnik reprodukcji, stopę reprodukcji majątku trwałego oraz stopę inwestowania. Badania prowadzono dla wszystkich gospodarstw oraz gospodarstw podzielonych na klasy według wielkości ekonomicznej (klasyfikacja KS6). Badaniami objęto lata 2007–2016. Zaobserwowano istotne zmiany w poszczególnych latach, z tego powodu okres badawczy podzielono na dwa równe podokresy, dla których wyznaczono średnie wartości wskaźników. Badania pokazały, że poziom inwestycji gospodarstw rolniczych w ocenie łącznej, dla wszystkich krajów UE, jest niewystarczający do odtworzenia ich majątku w obydwu podokresach. Pozytywnie należy ocenić to, że wartości wszystkich wskaźników rosną wraz ze wzrostem wielkości ekonomicznej gospodarstw. Poziom odtwarzania i pomnażania majątku w polskich gospodarstwach jest niższy niż średnia unijna dla gospodarstw słabszych ekonomicznie, natomiast zwykle wyższy w przypadku silniejszych.

Słowa kluczowe: inwestycje gospodarstw rolniczych, FADN, reprodukcja majątku

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DEVELOPMENT OF LISTED COMPANIES IN SELECTED VOIVODESHIPS OF EASTERN POLAND IN 2013–2017

Sławomir Lisek ✉, Lidia Luty

University of Agriculture in Krakow

ABSTRACT

Public companies are a subject of the public interest. Voivodships adjacent directly to the eastern border of Poland are industrialized less than the mean for Poland. This article to analyse changes of the financial conditions of the companies quoted at the Warsaw Stock Exchange (Giełda Papierów Wartościowych w Warszawie) from these voivodships in 2013–2017. Findings prove that these companies are not endangered by bankruptcy. Their situation is average, stable in investigated period.

Key words: stock exchange, financial condition, bankruptcy
JEL codes: C10, G10, G30, G33, M40

INTRODUCTION

Polish listed companies have been a subject of public interest for years, and many analysts and experts consider the stock exchange to be a gauge of the condition of the economy. Such a view is justified by the fact that listed companies are the largest investors in Poland and play a decisive role in terms of growth and economic development. These companies exchange are characterized by a high market share, large capital and labour force [Sudol 1999].

The matters related to stock exchange and listed companies are extensive and require in-depth analysis, taking many internal and external conditions into account, both on the micro- and macro-economic scale. This paper focuses on the analysis of selected companies located in the area along the eastern border of Poland.

The objective of the article is to recognize the financial condition of listed companies having their registered seat or main production plant in one of the three voivodeships: Podkarpackie, Lubelskie and Podlaskie in 2013–2017. In addition, we examined whether those businesses were at risk of bankruptcy.

CONDITIONS FOR ECONOMIC DEVELOPMENT

Eastern Poland is characterized by a lower degree of industrialization than other regions of the country, as well as a lower level of economic development. These areas are characterized by a low level of expenditure on research and development, which results in a lower innovation index. Insufficient funding for R&D has led to the reduction of technology transfer in the region [Surówka 2015].

In 2016, industrial production sold per capita in Poland amounted to PLN 33.9 thousand, whereas in Podkarpackie Voivodeship it was PLN 20.5 thousand, in Lubelskie Voivodeship PLN 17.2 thousand, and in Podlaskie Voivodeship PLN 22.7 thousand. For comparison, in Wielkopolskie Voivodeship, sold production per capita reached PLN 45.7 thousand,

Sławomir Lisek https://orcid.org/0000-0001-6520-7203; Lidia Luty https://orcid.org/0000-0001-8250-8331
✉sl1@op.pl

in Mazowieckie Voivodeship PLN 46 thousand, in Śląskie Voivodeship PLN 47.3 thousand, and in Pomorskie Voivodeship PLN 37.5 thousand[1]. The analysis of economic development conducted by Jabłoński [2014] shows that the surveyed voivodeships are at the end of the ranking compared to the rest of the country. Jabłoński also found that the lower economic development of the "Eastern Wall" was mainly due to differences in GDP per capita, per capita expenditure, gross wages, participation rate, and the share of employees in non-agricultural activities. Similar conclusions can also be found in other comparative analyses of regional development: Adamczyk-Łojewska [2014], Karmowska and Marciniak [2014], and Łyszczarz and Wyszkowska [2015].

Economic diversification between respective regions is not specifically a Polish problem. According to Benini and Czyżewski [2007], economic diversification between Russian regions is steadily increasing. The fastest economic growth is reported in the Moscow region, and possibly in capitals of other regions, or in locations rich in natural resources. Other regions are lagging in terms of growth and economic development. Large regional differences also occur in Croatia [Zmuk 2015], where the most economically developed region is the north-western region, while the most difficult situation is in the central and Eastern regions. The GDP per capita of the region where it is lowest slightly exceeds half of the GDP per capita of the region where it is highest. Regional differences in GDP per capita are also notable in Spain [Alfaro Navarro and López Ruiz 2008].

MATERIAL AND METHODS

The analysis of changes in the financial condition of Eastern Polish companies was carried out using a synthetic business condition index (synthetic business condition index – *MSKF*), which based on Tarczyński's financial condition index [2002]. Its structure was based on a number of financial indicators assigned to four groups of ratios (Table 1): liquidity (I), debt (II), management efficiency (III) and profitability (IV). Similar method is offered by Tarczyńska-Łuniewska [2013] to assess fundamental strengths.

Above-mentioned ratios were also used by Bayar et al. [2018] and Brennan and Kraft [2018]. Ratios: W_1, W_2, W_7, W_9, W_{10}, W_{11}, W_{12} were adopted as stimulants, while: $W_3 - W_6$ and W_8, respectively, as destimulants. The indices were standardized using the zero unitization method [Kukuła 2000]:

$$z_{ij}^t = \begin{cases} \dfrac{w_{ij}^t - \min\limits_{i,t} w_{ij}^t}{\max\limits_{i,t} w_{ij}^t - \min\limits_{i,t} w_{ij}^t}, & W_j - \text{stimulant} \\ \dfrac{\max\limits_{i,t} w_{ij}^t - w_{ij}^t}{\max\limits_{i,t} w_{ij}^t - \min\limits_{i,t} w_{ij}^t}, & W_j - \text{destimulant} \end{cases} \quad (1)$$

where:
z_{ij}^t – standardized value of j for company i in year t;
w_{ij}^t – value of j for company i in year t;
W_j – j value (Table 1);
$j = 1, 2, \ldots, m$; $i = 1, 2, \ldots, n$; $t = 1, 2, \ldots, s$;
m, n, s – number of diagnostic indices, companies and years, respectively.

According to Nermend [2013], the chosen method of normalization is not very sensitive to complacent values. The synthetic business condition index (*MSKF*) is the arithmetic mean of standardized index values:

$$MSKF_i^t = \frac{1}{m}\sum_{j=1}^{m} z_{ij}^t \quad (2)$$

where:
$MSKF_i^t$ – value of the taxonomic investment attractiveness index for company i in year t;
z_{ij}^t – standardized value of j for company i in year t;
$j = 1, 2, \ldots, m$; $i = 1, 2, \ldots, n$; $t = 1, 2, \ldots, s$.

The index is in the range of [0, 1]. The closer it is to one, the better the company's condition.

[1] Own calculations based on the 2015 Statistical Yearbook of the Regions – Poland and 2015 Statistical Yearbook of Industry – Poland [GUS 2015a, b].

Table 1. Financial ratios selected for the construction of *MSKF*

Group	Ratio	Definition
I	current ratio	$W_1 = A_c / D_c$
	quick ratio	$W_2 = (A_c - Z)/ D_c$
II	debt ratio	$W_3 = D / A$
	equity debt	$W_4 = D / E$
III	inventory turnover ratio	$W_5 = (I \cdot p) / C_{sp}$
	average collection period	$W_6 = (N \cdot p) / S$
	asset turnover ratio	$W_7 = S / A$
	accounts payable turnover ratio	$W_8 = (L \cdot p) / C_{sp}$
IV	net profit margin	$W_9 = N_p / P$
	return on assets (ROA)	$W_{10} = N_p / A$
	return on equity (ROE)	$W_{11} = N_p / E$
	earnings per share	$W_{12} = N_p / K$

A_c – current assets; D_c – current liabilities; Z – inventory; D – total liabilities; A – total assets; E – equity; I – average inventory; p – period; C_{sp} – cost of production sold; N – average receivables; S – net sales; L – average liabilities; N_p – net profit; P – sales revenue; K– number of shares.

Source: Own elaboration.

The analysis of changes in the financial situation of companies from the Eastern region, using the above mentioned index, was verified using the Altman *Z-score* model. The model is used primarily to estimate the risk of bankruptcy of a business. It is also used to assess the creditworthiness of issuers of bills of exchange for rediscount purposes [Rogowski 2001]. The model was first used in 1968 [Hołda and Pociecha 2009]. Altman's approach inspired other researchers to construct further bankruptcy models, including the Beerman model and the Holda model [Jerzmanowska 2004]. It was also subject to criticism. Such authors as Mączyńska and Zawadzki [2006] or Rogowski [1999], pointed out that as companies in Poland operate under different conditions than in Western countries, a simple translation of the Altman *Z-score* (and other Western models) is not justified. However, since then, the conditions of doing business in Poland have significantly converged with the Western ones.

The Altman *Z-score* model was subject to modifications. For the purposes of this paper, the Altman model of 2006 [Altman and Branch 2015] was used:

$$Z_{it}\text{-}score = 3.25 + 6.56X_{1it} + 3.26X_{2it} + 6.72X_{3it} + 1.05X_{4it} \quad (3)$$

where:
Z_{it}-*score* – discriminant function for company i in year t;
$X_1 = (A_c - D_c)/A$; $X_2 = (E_R / A$; $X_3 = EBIT/A$; $X_4 = E/D$;
A_c – current assets;
D_c – current liabilities;
D_R – remained earnings;
A – total assets;
EBIT – earnings before deducting interest and taxes;
E – equity;
D – total liabilities.

In this model, the value of *Z-score* function distinguishing a safe business from a business at risk is 0. The higher the value of *Z-score* function, the better the condition of a company.

The estimated value of *Z-score* function for the analyzed companies allowed for the assessment whether the businesses with the best *MSKF* ratings were not at risk of bankruptcy.

RESULTS

In 2017, 424 listed companies operated in Poland[2], of which 5.9% in the three surveyed voivodeships, i.e. 11 in Podkarpackie Voivodeship, 10 in Lubelskie Voivodeship, and 4 in Podlaskie Voivodeship. There is a noticeable disproportion in the distribution of listed companies in voivodeships. In particular, Mazowieckie Voivodeship, where the largest number of listed companies has their registered seats, stands out compared to other voivodeships.

Debt ratios (W_3 and W_4) indicate that the debt of the companies increased in the analyzed period (Table 2). Negative values (W_4) result from the fact that certain companies have negative equity. Liquidity (W_1 and W_2) decreased until 2016. Asset turnover slightly improved. In terms of profitability, the companies are highly diversified. The coefficients of variation for each ratio, in each year, exceed 0.3.

The values of *MSKF* calculated for companies located in the analyzed area are in the range of <0.355, 0.706> (Table 3), which means that listed companies

Table 2. Selected characteristic of financial ratios of the analyzed companies in 2013–2017

Value	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	W_9	W_{10}	W_{11}	W_{12}
						2013						
min	0.71	0.23	0.09	0.10	0.69	15.97	0.03	6.98	–0.24	–0.12	–0.40	–0.86
max	40.3	40.2	0.78	3.49	1 066	4 595	1.85	5 534	3.89	0.22	0.38	20.4
V	2.22	2.85	0.46	0.93	1.75	3.66	0.51	2.87	4.13	1.53	2.46	1.81
						2014						
min	0.95	0.23	0.08	0.09	0.39	14.09	0.03	5.18	–0.42	–0.17	–1.20	–3.39
max	108	108	0.86	5.87	948	1 174	2.08	1512	0.81	0.20	0.34	13.7
V	3.43	3.91	0.51	1.27	1.59	1.96	0.59	1.35	3.26	1.85	21.30	1.74
						2015						
min	0.41	0.10	0.08	0.09	0.02	10.37	0.08	47.15	–16.82	–1.41	–2.71	–8.22
max	4.59	4.08	0.88	7.31	653	1 052	2.07	2 742	0.22	0.21	0.31	23.4
V	0.55	0.69	0.49	1.32	1.33	1.86	0.57	1.90	5.11	19.14	6.67	2.66
						2016						
min	0.37	0.06	0.09	–14.98	0.04	11.78	0.04	61.60	–6.64	–0.31	–0.60	–4.07
max	4.10	4.10	1.03	3.49	7262	3 007	2.24	13 692	4.45	0.36	4.58	14.1
V	0.49	0.73	0.53	8.83	3.73	3.05	0.63	3.24	34.77	2.16	3.19	1.61
						2017						
min	0.41	0.05	0.04	–43.21	0.05	10.77	0.02	68.76	–1.60	–0.19	–0.23	–0.75
max	19.3	19.27	1.06	3.28	232 688	1 841	2.25	661 251	0.38	0.20	1.56	19.6
V	1.61	2.14	0.55	10.78	4.95	2.42	0.64	4.95	6.66	2.35	2.66	1.78

Source: Own elaboration based on Warsaw Stock Exchange database retrieved from www.gpw.pl [accessed 16.08.2018].

[2] Official website of the Warsaw Stock Exchange www.gpw.pl [accessed:16.08.2018].

Table 3. Values of *MSKF* of the analyzed companies in 2013–2017

Company	Sector	2013	2014	2015	2016	2017
Podkarpackie Voivodeship						
Asseco Poland S.A.	IT	0.561	0.555	0.552	0.550	0.550
Asseco South Eastern Europe	IT	0.548	0.544	0.545	0.544	0.545
Firma Oponiarska Dębica S.A.	car parts	0.584	0.577	0.574	0.568	0.579
Polwax S.A.	chemicals	0.558	0.590	0.593	0.596	0.575
OPTeam S.A.	IT	0.548	0.556	0.557	0.578	0.542
Resbud S.A.	construction	0.448	0.488	0.308	0.494	0.523
Makarony Polskie S.A.	food	0.534	0.533	0.539	0.537	0.539
PBS Finanse S.A.	food	0.596	0.706	0.537	0.534	0.515
Stomil Sanok S.A.	car parts	0.573	0.566	0.571	0.562	0.556
Śnieżka S.A.	construction	0.579	0.580	0.587	0.590	0.581
Zakłady Magnezytowe Ropczyce S.A.	construction	0.529	0.523	0.528	0.535	0.532
Lubelskie Voivodeship						
Asseco Business Solutions S.A.	IT	0.552	0.556	0.559	0.561	0.547
Grupa Azoty Zakłady Azotowe Puławy S.A.	chemicals	0.621	0.614	0.624	0.589	0.584
Biomed Lublin S.A.	pharmaceutics	0.513	0.503	0.419	0.457	0.498
Lubelski Węgiel Bogdanka S.A.	mining	0.553	0.540	0.491	0.535	0.587
Ursus S.A.	means of transport	0.492	0.506	0.509	0.505	0.487
Emperia Holding S.A	food	0.573	0.588	0.588	0.597	0.591
Interbud Lublin S.A.	construction	0.507	0.447	0.491	0.467	0.355
Protektor S.A.	clothing and footwear	0.567	0.569	0.569	0.561	0.555
Sanwil Holding S.A	clothing and footwear	0.544	0.535	0.523	0.532	0.547
Wikana S.A.	real property sale	0.466	0.450	0.480	0.479	0.479
Podlaskie Voivodeship						
Unibep S.A.	construction	0.540	0.539	0.536	0.515	0.533
Pfleiderer Group S.A.	wood	0.555	0.559	0.554	0.510	0.510
Przedsiębiorstwo Przemysłu Spożywczego PEPES S.A.	food	0.530	0.520	0.516	0.520	0.520
AC S.A.– ACAUTOGAZ	car parts	0.592	0.590	0.583	0.585	0.575

Source: Own elaboration based on Warsaw Stock Exchange database retrieved from www.gpw.pl [accessed 16.08.2018].

from the region are in a mediocre condition. Unfortunately, there is no observable upward trend for the financial condition of the analyzed businesses. The diversity of the synthetic index *MSKF* in subsequent years between 2013 and 2017 expressed by the coefficient of variation was low and did not exceed 0.120.

When assessing *MSKF* (the figure), one can note that the condition of the analyzed companies remains at a similar level over time, changing along the sine curve (with a slight increase in one year and a decrease the next year). As of the end of the analyzed period, businesses from Podkarpackie Voivodeship were in the best condition, while companies from Lubelskie Voivodeship were in the worst condition.

The rankings were not homogeneous in those years (the figure). The stability of the built order systems was verified by the Spearman rank correlation coefficient ($p < 0.01$). High values of this indicator indicate that the rankings are similar.

The analyzed businesses are generally not at risk of bankruptcy (Table 4). This risk occurs only in relation to Interbud Lublin S.A. (2016 and 2017) and Biomed Lublin S.A. (2015). In all analyzed years, Grupa Azoty Zakłady Azotowe Puławy S.A. had the best *Z-score*: over 10 in the whole analyzed period. Between 2013 and 2016, Asseco Business Solutions S.A. held the strongest position; however, its condition deteriorated significantly in 2017 – the *Z-score* dropped from 16.3 in 2016 to 7.3 in 2017. A similar situation occurred to Protektor S.A. and PBS Finanse S.A., although in their case the 2017 decrease was less significant. In the case of ACAUTOGAZ and Asseco South Eastern Europe, the *Z-score* was around 10. Emperia Holding S.A., Śnieżka S.A., Firma Oponiarska Dębica S.A., Polwax S.A., Stomil Sanok S.A., Asseco Poland S.A., Sanwil Holding S.A., OPTeam S.A., Makarony Polskie S.A., Unibep S.A., Zakłady Magnezytowe Ropczyce S.A., Przedsiębiorstwo Przemysłu Spożywczego PEPES S.A., and Pfleiderer Group S.A. reported average *Z-score* values. Ursus S.A. and Wikana S.A. were in a poor condition, but not at a direct risk of bankruptcy.

Pearson's correlation coefficients between *MSKF* and *Z-score* are statistically significant at the significance level of 0.05 and in subsequent years between 2013 and 2017 they amounted to 0.409, 0.606, 0.695, 0.739 and 0.367, respectively.

Among the top five companies (the figure), in terms of the last year's ranking, Lubelski Węgiel Bogdanka S.A. clearly stands out with the second position. In all analyzed years (excluding 2017), this company was in the middle of the ranking, and in 2015 it was even at the bottom. However, in 2017, it achieved a much better financial result than in previous years. Its profitability ratios in 2017 were over three times higher than in 2016. In addition, the already low debt had been reduced. These facts – despite the decrease in liquidity –

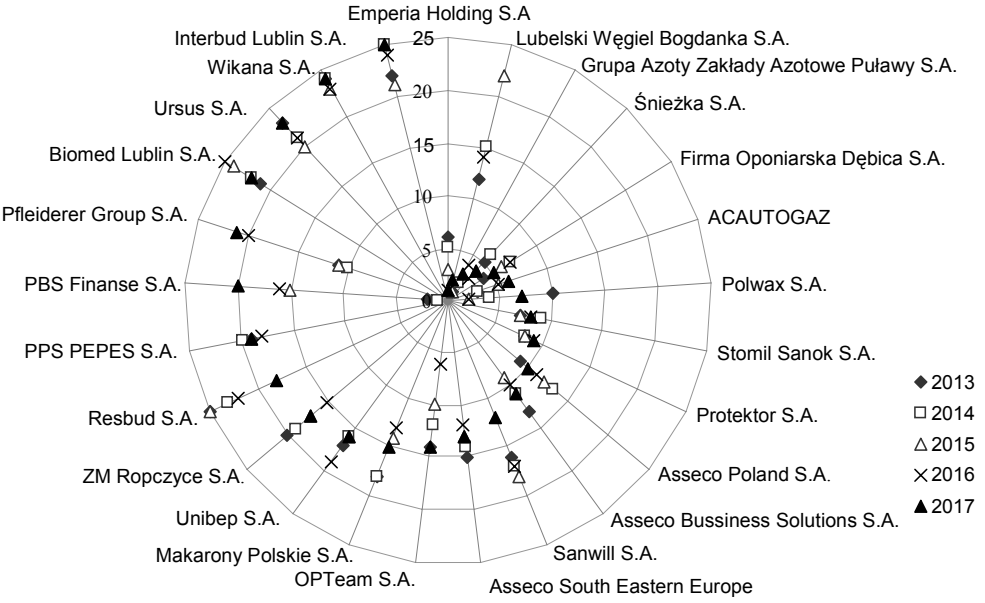

Fig. Ranking of companies based on *MSKF* in 2013–2017

Source: Own elaboration based on Table 3.

Table 4. Functional *Z-score* values for the analyzed companies in 2013–2017

Company	2013	2014	2015	2016	2017
Emperia Holding S.A	5.49	5.71	5.12	5.51	5.23
Lubelski Węgiel Bogdanka S.A.	6.03	5.66	4.59	5.91	7.78
Grupa Azoty Zakłady Azotowe Puławy S.A.	10.94	10.56	12.01	11.24	10.4
Śnieżka S.A.	7.5	7.85	8.53	8.42	8.18
Firma Oponiarska Dębica S.A.	7.34	7.74	8.16	8.19	8.3
AC S.A. – ACAUTOGAZ	11.63	11.62	11.54	9.98	9.25
Polwax S.A.	7.05	8.69	8.73	9.04	8.22
Stomil Sanok S.A.	8.83	8.52	8.54	8.35	7.18
Protektor S.A.	12.05	12.93	12.57	10.71	9.26
Asseco Poland S.A.	8.05	8.15	7.37	7.14	7.09
Asseco Business Solutions S.A.	13.42	16.71	16.85	16.3	7.3
Sanwil Holding S.A	7.81	6.8	4.65	6.45	11.03
Asseco South Eastern Europe	10.44	9.27	9.78	8.89	9.32
OPTeam S.A.	5.05	5.38	5.77	6.51	4.3
Makarony Polskie S.A.	4.71	5.1	5.6	5.44	5.35
Unibep S.A.	5.29	5.47	4.97	5.06	4.97
Zakłady Magnezytowe Ropczyce S.A.	6.12	5.75	5.9	6.87	6.68
Resbud S.A.	8.67	8.27	1.15	4.43	30.7
Przedsiębiorstwo Przemysłu Spożywczego PEPES S.A.	6.17	5.61	5.51	5.79	5.66
PBS Finanse S.A.	13.89	15.85	11.3	10.41	7.87
Pfleiderer Group S.A.	5.75	6.41	8.34	4.23	3.81
Biomed Lublin S.A.	7.37	6.66	–1.34	0.16	3.82
Ursus S.A.	2.58	4.95	4.97	3.89	3.23
Wikana S.A.	7.88	7.93	2.95	2.54	2.39
Interbud Lublin S.A.	6.73	2.63	3.93	–3.21	–2.04

Source: Own elaboration based on Table 3 data and Warsaw Stock Exchange database retrieved from www.gpw.pl [accessed 16.08.2018].

made it possible for the company to be ranked second. The leader of the ranking is Emperia Holding S.A. It is characterized by satisfactory profitability, satisfactory liquidity, adequate levels of debt and rapid turnover. The company ranked third, Grupa Azoty Zakłady Azotowe Puławy S.A., was in the lead throughout the analyzed period. It is characterized by very low debt, very high liquidity, good profitability, and rapid turnover. In 2013–2015, the company was the leader in the ranking, dropping to the fourth place in 2016 and

moving up to the third place in 2017. Śnieżka S.A., ranked fourth in 2017, in the analyzed years enjoyed a solid position in the top part of the ranking. The company had very high profitability. Its debt was negligible. However, its successful image has been tarnished by slightly lower-than-standard liquidity and slower turnover than in the case of companies from the top three positions in the ranking. The fifth company was Firma Oponiarska Dębica S.A. It had high profitability. Its debt was negligible. Nevertheless, its rating has been reduced by slightly too low liquidity and slightly too slow turnover. It is worth noting that the top three positions went to companies from Lubelskie Voivodeship, while the fourth and fifth positions were taken by Podkarpackie Voivodeship businesses.

The sixth company classified in 2017 was ACAUTOGAZ. The company dropped out of the top five in the last analyzed year, having been there regularly before. It was characterized by low, albeit steadily growing, debt. Its liquidity was very good, but it was steadily decreasing. Profitability remained at a good, roughly constant level. So did the turnover ratios. Polwax S.A. is a company operating in the chemical industry. In 2013 it ranked tenth, then every year in the top five, and at the end of the period it was seventh. Its debt, initially quite high, has significantly decreased. Liquidity was sufficient and improved over time. The company was always profitable: profitability improved in 2014, 2015 and 2016 and slightly deteriorated in 2017. The next company, Stomil Sanok S.A., ranked seventh to ninth throughout the analyzed period. Its debt was low, but it was gradually growing. Liquidity was high, although it slightly decreased in the last year. The company's profitability remained at a satisfactory quasi constant level. Protektor S.A. ranked eighth in the ranking from 2013 until 2015, and in the following year it ranked ninth. Its debt was small but it was slightly growing. The initially high liquidity was steadily decreasing. While current liquidity remained at the required level, quick liquidity at the end of the period was slightly too low. Profitability increased in 2013–2015 and then decreased. The tenth position in 2017 was taken by Asseco Poland S.A., which in 2013 ranked ninth, in 2014 fell to the thirteenth position, and since then the position of this company has been steadily improving. Its debt was low, and its changes were also insignificant. Liquidity was normal. The company's profitability was satisfactory, while the turnover was quite slow. In the last year of our analysis, Asseco Business Solutions S.A. ranked one place lower than Asseco Poland S.A. The debt of that company was negligible, the liquidity was high and the turnover was average. Return on assets and sales was satisfactory, while earnings per share were quite low. Next, Sanwill S.A., was characterized by low debt. Liquidity was high. However, the company generated losses and showed slow rotation, which resulted in a decrease in the synthetic index and thus in its position in the ranking. Asseco South Eastern Europe was characterized by sufficient liquidity and low debt. Its profitability and turnover were at an average level. OPTeam S.A., which ranked fourteenth in 2017, reported an average level of debt and average liquidity. In the last year, the company suffered losses, so its profitability turned negative. Turnover was average. The next company in the ranking, Makarony Polskie S.A., was characterized by average debt. It had sub-standard liquidity. Its profitability was average and its turnover was slow. The sixteenth company in the ranking, Unibep S.A., reported high debt and slightly sub-standard liquidity. Its profitability was average and the turnover was quite slow. In turn, Zakłady Magnetyzowe Ropczyce S.A. had low debt and sufficient liquidity. Profitability was average. Turnover was very slow. Resbud S.A. ranked eighteenth, with high liquidity and low debt. It was, however, an unprofitable company, with a very slow turnover. The next company, Przedsiębiorstwo Przemysłu Spożywczego PEPES S.A., was characterized by average debt and low liquidity. Its profitability was low and the turnover was slow. In the twentieth position was PBS Finanse S.A., a company characterized by high liquidity and low debt. However, the turnover was slow and in the last year the company became unprofitable.

The last five companies in the 2017 ranking, except for Pfleiderer Group S.A., which was in the middle of the ranking between 2013 and 2015, had always been at the bottom. Pfleiderer Group S.A. showed good profitability, while its debt was strong, its liquidity low and its turnover slightly too slow. Biomed Lublin S.A. either generated losses or achieved at best negligible profitability. The turnover ratios were very

slow. Liquidity was slightly too low. Debt was at the standard level. In 2015, the company was at risk of bankruptcy, but managed to recover. Similarly, Ursus S.A. most often incurred losses, had insufficient liquidity and slow turnover. Based on the Altman *Z-score* model, it was not at risk of bankruptcy, but at the end of the analyzed period the results of this company were worse than those of Biomed Lublin S.A. Although Wikana S.A. always reported certain profitability, it was heavily indebted, had low liquidity and slow turnover, so it ranked next to last in the ranking. The ranking ended with Interbud Lublin S.A. It was an unprofitable company with negative equity, virtually no liquidity and a massive debt. Since 2016, it has been under constant threat of bankruptcy.

CONCLUSIONS

Podkarpackie, Lubelskie and Podlaskie Voivodeships are characterized by a low level of industrial production compared to other voivodeships of Poland. In the case of Podkarpackie and Lubelskie Voivodeships, industrial production sold is less than 2/3 of the national average, while in Podlaskie Voivodeship it barely reaches 2/3 of the national average. The number of listed companies in the analyzed voivodeships also differs significantly from the leading voivodeships.

The study showed that the financial condition of the analyzed listed companies was in general mediocre, as evidenced by the values of *MSKF*. The rankings of the analyzed companies in respective years were similar.

Dynamic view of the conducted analyses allows us to conclude that the financial condition of those companies does not present a stable trend. In the case of ten companies, their position in 2017 compared to the rank in 2013 improved, while in the case of four companies it remained unchanged. Lubelski Węgiel Bogdanka S.A. is worth noting, as it advanced by as many as ten positions, mainly due to a large increase in profitability. Extreme positions of PBS Finanse S.A. and Pfleiderer Group S.A. deteriorated by eighteen and ten positions respectively, in the case of Pfleiderer Group S.A. due to a decrease in profitability and an increase in debt, and in the case of PBS Finanse S.A., mainly due to a huge loss in 2017.

Among the companies, only two were at risk of bankruptcy in the analyzed years: Interbud Lublin S.A. and Biomed Lublin S.A. The reasons for this situation can be found, in the case of Biomed Lublin S.A., in significant debt and large losses in 2015 and 2016, but in 2017 the situation significantly improved, while in the case of Interbud Lublin S.A. every aspect of its condition was negative in the last three years and one can hardly see any positive signs of change for this business. In relation to other companies, it can be concluded from the estimated values that their operations are not at risk, as evidenced by the estimated values of the discriminant function. It can be concluded that the condition of these companies has been stable over time with slight deviations in respective years. For most of them, *Z-score* values in the last year were lower than in the first year of analysis.

REFERENCES

Adamczyk-Łojewska, G. (2014). Rozwój polskich rejonów w okresie poakcesyjnym [Development of Polish regions in the post-accession period]. Marketing i Rynek, 10, 11–21.

Alfaro Navarro, J. L., López Ruiz, V. R. (2008). El capital estructural tecnológico como medida de crecimiento económico regional [Technological structural capital as a measure of regional economic growth]. Estudios De Economía Aplicada, 26 (3), 57–72.

Altman, E. I., Branch, B. (2015). The Bankruptcy System's. Chapter 22. Recidivism Problem: How Serious is It? The Financial Review, 50 (1). DOI: 10.1111/fire.12058

Bayar, O., Huseynov, F., Sardarli, S. (2018). Corporate Governance, Tax Avoidance, and Financial Constraints. Financial Management, 47 (3), 651–677. DOI: 10.1111/fima.12208

Benini, R., Czyżewski, A. (2007). Regional disparities and economic growth in Russia; new growth patterns and catching up. Economic Change and Restructuring, 40 (1–2), 91–135. DOI: 10.1007/s10644-007-9026-0

Brennan, M. J., Kraft, H. (2018). Leaning Against the Wind: Debt Financing in the Face of Adversity. Financial Management, 47 (3), 485–518. DOI: 10.1111/fima.12227

Główny Urząd Statystyczny (2015a). Rocznik Statystyczny Województw 2015 [2015 Statistical Yearbook of the Regions – Poland]. Warszawa.

Główny Urząd Statystyczny (2015b). Rocznik Statystyczny Przemysłu 2015 [2015 Statistical Yearbook of Industry – Poland]. Warszawa.

Hołda, A., Pociecha, J. (2009). Probabilistyczne metody badania sprawozdań finansowych [Probabilistic methods of auditing financial statements]. Wydawnictwo UE w Krakowie, Kraków.

Jabłoński, Ł. (2014). Spójność rozwoju regionów w Polsce w latach 2002–2010 [Cohesion of regional development in Poland in 2002–2010]. Nierówności Społeczne a Wzrost Gospodarczy, 37, 204–205.

Jerzmanowska, M. (2004). Analiza ekonomiczna w przedsiębiorstwie [Economic analysis in the enterprise]. PWE, Warszawa.

Karmowska, G., Marciniak, M. (2014). Wielowymiarowa analiza porównawcza rozwoju regionalnego Polski Wschodniej i Zachodniej [Multidimensional comparative analysis of regional development of Eastern and Western Poland]. Prace Naukowe UE we Wrocławiu, 347, 215–227.

Kukuła, K. (2000). Metoda unitaryzacji zerowanej [The method of zero-standardization]. Wydawnictwo Naukowe PWN, Warszawa.

Łyszczarz, B., Wyszkowska, Z. (2015). Regionalne zróżnicowanie wzrostu gospodarczego i dochodów w Polsce [Regional diversification of economic growth and income in Poland]. Studia Ekonomiczne. Zeszyty Naukowe UE w Katowicach, 213, 157–168.

Mączyńska, E., Zawadzki, M. (2006). Dyskryminacyjne modele predykcji bankructwa przedsiębiorstw [Discriminatory prediction models of enterprise bankruptcy]. Ekonomista, 2, 205–235.

Nermend, K. (2013). Properties of normalization methods used in the construction of aggregate measures. Folia Oeconomica Stetinensia, 12 (2), 31–45.

Rogowski, G. (2001). Zastosowanie modelowania w bankowości [Application of banking modeling]. Wydawnictwo Forum Naukowe, Poznań.

Rogowski, W. K. (1999). Możliwość wczesnego rozpoznawania symptomów zagrożenia zdolności płatniczej przedsiębiorstwa [The possibility of early recognition of symptoms of the company's ability to pay]. Bank i Kredyt, 6, 56–72.

Sudol, S. (1999). Przedsiębiorstwo. Podstawy nauki o przedsiębiorstwie. Teorie i praktyka zarządzania [Enterprise. Basics of enterprise science. Theories and practice of management]. Towarzystwo Naukowe Organizacji i Kierownictwa, Toruń.

Surówka, A. (2015). Innowacyjność województw Polski Wschodniej na tle kraju [Innovation of voivodships of Eastern Poland against the background of the country]. Prace Naukowe UE we Wrocławiu, 380, 319–326.

Tarczyńska-Łuniewska, M. (2013). Metodologia oceny siły fundamentalnej spółek (giełdowych i pozagiełdowych) [Methodology for assessing the fundamental strength of companies (stock exchange and over-the-counter)]. Wydawnictwo Zapol, Szczecin.

Tarczyński, W. (2002). Fundamentalny portfel papierów wartościowych [Fundamental portfolio of securities]. PWE, Warszawa.

Zmuk, B. (2015). Adoption and benefits of statistical methods in enterprises: differences between Croatian regions. South East European Journal of Economics and Business, 10 (1), 55–65. DOI: 10.1515/jeb-2015-0004

ROZWÓJ SPÓŁEK GIEŁDOWYCH WYBRANYCH WOJEWÓDZTW POLSKI WSCHODNIEJ W LATACH 2013–2017

STRESZCZENIE

Giełda papierów wartościowych jest ważnym wyznacznikiem kondycji gospodarki, stąd spółki giełdowe są przedmiotem publicznego zainteresowania. Województwa leżące bezpośrednio przy wschodniej granicy Polski charakteryzują się niższym poziomem uprzemysłowienia od średniej krajowej. Przedmiotem artykułu jest analiza zmian kondycji finansowej spółek giełdowych z tego regionu w latach 2013–2017. Wyniki badań wskazują, iż spółki te nie są zagrożone bankructwem – charakteryzują się przeciętną sytuacją finansową, stałą w badanym okresie.

Słowa kluczowe: giełda, kondycja finansowa, bankructwo

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LIFESTYLE AND ITS QUALITY AMONG RESIDENTS OF WARSAW SUBURBAN COMMUNES

Anetta Majchrzak-Jaszczyk[1], Barbara Pędraszewska-Sołtys[1], Jolanta Mogiła-Lisowska[1] ✉, Piotr Bartnik[2]

[1] Józef Piłsudski University of Physical Education in Warsaw
[2] University of Technology and Humanities in Radom

ABSTRACT

Research focuses on potential existence of relation between the quality of life of rural respondents (rated subjectively) and the level of physical activity and the amount of time spent on it. Additionally, it investigates to what extend the respondents lead healthy lifestyle which includes healthy diet. Diagnostic survey is a research method that was applied. The techniques used include: international physical activity questionnaire (IPAQ) test, Batterie rapide d'efficience frontale (BREF) test – verifies quality of life and interviews with original questionnaire (developed by authors). The research shows that rural areas inhabitants are aware of factors that determine people's health. At the same time they seem not to be aware of negative influence of using stimulants on their health. The remarkable thing is that respondents point out how important physical activity is as an element determining well-being. After conducting the research, a leading conclusion emerges that there is a need to formulate an educational program for rural residents, indicating the proper implementation of individual elements of the lifestyle.

Key words: lifestyle, rural area, physical activity, Warsaw suburbs
JEL codes: I12, Q19, Z2

INTRODUCTION

In the available literature on the subject, we do not find research that would show the relationship of the quality of life of rural residents with the style of this life and especially physical activity. A widely perceived image of uneven distribution of farmers' annual work stimulates reflection on their participation in activity, which is an recognized as one of many elements shaping health [Cury and Ravenscroft 2001, Janion 2006, Fortuna 2012, Wojtasik et al. 2015]. Not always the conditions in which a person lives and the environment in which he works, or the specificity of this work, translates into maintaining good health through physical activity and an appropriate quality of life [Woźniak et al. 2015].

Scientific research conducted on a European scale has shown that the state of human health is determined by 53% of lifestyle, 21% by environmental factors, 16% depends on genes and 10% on specialist medical care [Mogiła-Lisowska 2010]. This fact inspires to pay special attention to the various components of a healthy lifestyle. Nowadays from the perspective of physiology, physical activity is perceived as a necessary element in the everyday functioning of a human being [Booth et al. 2002]. Compensating the sedentary nature of work with physical exercises is essential for health [Kwilecka and Brożek 2007]. According to

Anetta Majchrzak-Jaszczyk https://orcid.org/0000-0002-2116-7614; Barbara Pędraszewska-Sołtys https://orcid.org/0000-0002-4668-7085; Jolanta Mogiła-Lisowska https://orcid.org/0000-0003-2572-3427; Piotr Bartnik https://orcid.org/0000-0001-7448-7163
✉jolantamogilalisowska@wp.pl

the World Health Organization guidelines, in order to maintain health, a person should undertake physical activity of moderate intensity at least 4–5 times a week for 30 min [EACEA 2008]. At the same time, the forms of physical activity implemented should be adapted to the needs and physical fitness, as well as the individual preferences of people exercising, so that they positively affect the quality of life.

As mentioned before, physical activity, which is a leading component of a healthy lifestyle, should go hand in hand with proper nutrition. The latter occurs when a person provides his or her body with the necessary nutrients, at the same time supplying it with the energy necessary for its functioning [Drewnowski and Evans 2001]. In Poland, the biggest problem of everyday diet is excessive consumption of foods, including animal fats and carbohydrates, shortage of dairy products, fruits, vegetables and whole grains. In combination with the irregularity of eating meals, such a diet is not conducive to a healthy lifestyle [Mogiła-Lisowska 2010].

The increase in the level of technological development, the pace of professional life, the all-embracing stress, poor nutrition, low physical activity, and frequent use of stimulants – largely favors the occurrence of non-infectious diseases, for example: obesity, heart and circulatory system diseases, depression, cancer and others [Haapanen-Niemi 2000]. The antidote for them is certainly regular physical activity combined with proper diet and avoidance of stimulants. Meanwhile, working in the countryside gives you a chance to realize a greater dimension of activity than it is in the case of living in a large agglomeration, for example in professions of white-collar workers, although at the same time many studies emphasize the effects of disharmonious workload on farmers' work [Holmberg et al. 2003, Xiao et al. 2013]. At the same time, being in the natural environment can mobilize physical activity undertaken intentionally for health and relaxation [White et al. 2016].

Bearing in mind the value of physical activity, we undertook to find the relationship between lifestyle – especially the dimension of physical activity and the quality of life of rural families. This objective determined the definition of research issues, determined by the search the relationship between the quality of life rated subjectively by the respondents and the level of activity and time used by the inhabitants of villages near Warsaw, and to what extent the respondents implement the so-called healthy lifestyle in the use of stimulants and diet.

MATERIAL AND METHODS

The diagnostic method is used. The technique used is a coherent international physical activity questionnaire (IPAQ) test examining physical activity, Batterie rapide d'efficience frontale (BREF) test verifying the quality of life and an interview with an author's questionnaire (research tool). The IPAQ test is one of the best and the most recommended tests to assess the level of physical activity. It is particularly recommended by international researchers like the European Physical Activity Surveillance System (EUPASS) and the European Health Interview Survey (EUROHIS). The questionnaire provides a comprehensive picture of the subject's physical activity [Biernat et al. 2007].

The BREF test is used to assess the quality of life. It was adopted and introduced to Polish conditions by Wołowicka and Jaracz [2001]. Research tools are questionnaires of the above-mentioned tests.

The study group consists of 174 people, coming in equal proportions from the municipalities of Leoncin and Kampinos. Only adults were involved in the study. Respondents over the age of 61 are dominant, just over 18% of all respondents. The least numerous group – in the 18–24 age bracket, they constitute only 4.6% of all respondents.

Farmers dominate among the surveyed, they constitute 54% of all respondents, the second place is occupied by sellers (less than 6%). Most people live in two-generation families, they constitute 46.4% of all respondents. Single or double families constitute 16.7% of all respondents.

RESULTS AND DISCUSSION

In order to determine the opinion of respondents on factors affecting health, subjects were asked to rate (1 – a minor factor, 5 – a very significant factor) to individual determinants such as nutrition, weight,

smoking, natural habitat, physical activity, alcohol consumption, stress, genetic predisposition and support from family or friends.

Taking into account the arithmetic mean of the answers given, in the opinion of the respondents the first, the most important factor affecting our health is nutrition, the second the physical activity, and the third – natural habitat (Table 1). The least important factors for our health were smoking, genetics and alcohol consumption. 50% of respondents considered physical activity as an extremely important factor and it was the highest percentage of responses given at level 5. Second place was stress, the third – nutrition and natural habitat. No person recognized nutrition as a factor irrelevant to our health. The most varied were the answers to alcohol consumption, and the smallest ones – the impact of nutrition.

The nationwide research of the adult population of Poles has determined the specificity of the style of drinking alcohol in the countryside. Namely, the inhabitants of the village are dominated by: abstinence (women), daily drinking, drinking every 2–3 days, and drinking less than once a week.

For contrast, residents of small towns more often drink alcohol once a week than others, and residents of large cities drink the least among three groups of residence. Unfortunately, with age, the frequency of alcohol drinking among adult Poles increases [Mogiła-Lisowska 2010].

In our interview, the frequency of alcohol consumption has the following picture – 34% of respondents said they did not drink alcohol at all, 38% said they consumed alcohol less than once a week, 21% answered that they drink once a week or every two or three days. Only 4% of people admitted to drinking alcohol every day. This element of the drinking model differs from the population studies cited above – the type of alcohol consumed is mostly (45%) of the preferences of weak alcohols, 17% indicate strong drinks, while 38% had no opinion on the subject. Only 6% of people said that they thought about stopping or changing the model of drinking alcohol, 11% of the respondents happened to have feelings of guilt and remorse in connection with the consequences of their drinking. Share of 10% admitted to irritation or anger in connection with criticizing their drinking patterns by close ones, and 8% of respondents happened to reach for alcohol right after waking up after too much intake the previous day. Exactly 1.8% of all respondents answered yes to all the above questions, 2.4% of the respondents to three questions, 5.5% of people to two and 9.7% of people for one.

The Cage test indicates the probability of alcohol addiction when minimum two of the four options are experienced by the subject. The respondents' declarations show that 9.7% of them observe two or more of the four behaviors related to alcohol consumption. Over half of the respondents never smoked cigarettes,

Table 1. The distribution of responses assessing the importance of particular factors for health

Specification		Nutrition	Body weight	Smoking	Natural habitat	Physical activity	Alcohol	Stress	Genes	Support	Others
		%									
Level of importance	1	0	2	11	1	1	11	8	4	4	0
	2	4	12	5	5	6	10	6	12	5	17
	3	14	19	17	14	15	21	16	25	25	50
	4	35	32	22	34	29	29	22	31	33	17
	5	47	36	45	47	50	29	48	28	34	17
Arithmetic mean		4.25	3.85	3.78	4.13	4.19	3.46	3.97	3.63	3.80	3.33
Factor of changebility		0.20	0.29	0.37	0.26	0.24	0.41	0.32	0.32	0.31	0.31

Source: The author's own research outcomes.

22% quit smoking and 24% smoked cigarettes. Meanwhile, smoking is negatively correlated with participation in physical recreation, as indicated by the National Cancer Institute [n.d.]. An important problem in our analysis is to determine the level of physical activity of the surveyed villagers. It was analyzed due to the seasonal nature of work, separately for individual seasons (Table 2).

The respondents were characterized by medium or large variation due to the time devoted to particular activities. The greatest dispersion was observed in the distribution of time devoted to hard work and walking or cycling in the winter, the smallest in the distribution of time spent on the sitting or lying down also in the winter. The average time devoted to hard work ranged from 2.5 h a day in winter to 3.5 h in the summer. The average respondent spent 1.8 h a day in the winter to 3.4 h in the summer on walking or cycling. The average time spent standing or walking ranged from 3.5 h in the winter to 4 h in the summer. The highest average time was observed in winter and was devoted to sitting or lying down, 4.7 h a day. In summer, the respondents spent an average of 3 h a day on this activity. In spring, autumn and winter, the respondents spent the least time on walking or cycling, in the summer on sitting or lying down. In spring and summer, the highest average time was observed for standing or walking, in autumn and winter for sitting or lying.

The health consequences of a sedentary lifestyle are widely known today. The burden of the movement apparatus, circulatory system, respiratory system, or deprivation of objective metabolic possibilities are examples indicated most often in many social studies [Niedzielska et al. 2017]. Meanwhile, respondents reported time-varying sitting data in particular seasons (Table 3).

Table 2. Statistical measures describing the distribution of the number of hours spent daily on particular activities in subsequent seasons

Physical activity	Season of the year	Arithmetic mean	Factor of changebility	The first quartile	The second quartile	The third quartile
Sitting/ /Lying	spring	3.3	0.67	2	3	4
	summer	3.0	0.76	1	2	4
	autumn	3.8	0.59	2	3	5
	winter	4.7	0.49	3	5	6
Standing/ /Walking	spring	3.6	0.63	2	3	5
	summer	4.0	0.61	2	4	6
	autumn	3.8	0.61	2	3.5	5
	winter	3.5	0.69	2	3	5
Walking/ /Cycling	spring	2.9	0.68	1	3	4
	summer	3.4	0.65	2	3	5
	autumn	2.7	0.78	1	2	4
	winter	1.8	0.97	1	1	2
Working hard	spring	3.2	0.87	1	3	5
	summer	3.5	0.81	1	3	5
	autumn	3.3	0.84	1	3	5
	winter	2.5	0.99	1	2	4

Source: The author's own research outcomes.

Table 3. Statistical measures describing the distribution of time spent in sitting position in particular seasons of the year

Specification	Weekday				Weekend			
	spring	summer	autumn	winter	spring	summer	autumn	winter
Arithmetic mean	3.5	3.2	3.9	4.5	3.4	3.3	3.9	4.4
Factor of changeability	0.64	0.73	0.60	0.51	0.56	0.58	0.53	0.51
The first quartile	2	2	2	3	2	2	2	3
The second quartile	3	2	3	4	3	3	4	4
The third quartile	4	4	5	6	4	4	5	6

Source: The author's own research outcomes.

During the week, the respondents spent time in a sitting position average from 3.2 h a day in summer to 4.5 h a day in winter. During the weekend this time was longer in the summer, it was 3.3 h a day and shorter in the winter, 4.4 h. In the winter, 25% of respondents spent time sitting down at least 6 h a day, both during the week and during the weekend. The respondents were characterized by moderate or strong variability due to the sitting time. The greatest variation was observed in the summer day in summer, the smallest in the whole week in winter.

The respondents are dominated by people with a sufficient level of activity, they constitute 55% of all respondents (Table 4). Only 28 people (16%) are rural residents who do not show a sufficient level of physical activity.

The results can be considered satisfactory because over 80% of respondents are people who represent a high or sufficient level of activity.

In view of the lifestyle elements discussed above, the respondents define their quality of life in a varied way. It was observed that the average level of satisfaction with the physical domain among respondents was 70%. The respondents were characterized by poor diversity, as the deviation from the average level constituted only 22% of the arithmetic mean. Half of the respondents defined their level of satisfaction with this domain as not less than 71%. It can be concluded that the inhabitants of the surveyed villages are generally satisfied with their health, because only 8.62% of the respondents obtained less than 50% of the 35 points possible to obtain in this domain.

Table 4. Respondents by activity level (results of the IPAQ test)

Level of activity	*N*	%
Insufficient	28	16
Sufficient	95	55
High	51	29

Source: The author's own research outcomes.

The level of satisfaction of the respondents from the psychological domain is higher than from the physical domain. The average quality of life assessment in this area was 77% with an average deviation of 12%. Half of the respondents assessed their satisfaction with this domain of life as not smaller than 78%. The distribution of the level of satisfaction with the psychological domain was characterized by left-sided asymmetry, and thus persons with a degree of satisfaction above the average level were dominant. Only 2.3% of rural residents obtained less than 50% of the maximum 30 points in this domain.

The level of satisfaction with the social domain among respondents was even higher than from the psychological domain. Almost every fourth inhabitant of the village obtained the maximum number of 15 points in this category of quality of life. Only 2.87% of the respondents won less than 60% of points. The average level of satisfaction with the sphere of social life of respondents was 88% with an average deviation of 14%. Half of the rural population assessed the degree of satisfaction with this domain as not less than 87%. Distribution of satisfaction level was characterized by a very strong left-side asymmetry, which means that

respondents with a higher than average level of satisfaction with this sphere of life prevailed considerably.

The level of satisfaction of the inhabitants of the studied villages from the environmental domain was definitely lower than from the psychological and social domains, but slightly higher than from the physical domain. The average level of satisfaction in this category of life was 72% with an average deviation of 12%. Half of the respondents assessed the quality of life in this area at a level of not less than 74%. Persons who obtained less than 50% in this domain from maximum 35 points constituted only 5.17% of all respondents.

Summing up, it can be stated that the respondents were rather satisfied with the quality of life in the physical and environmental domains and very satisfied with the quality of life in the psychological and social domains. Connections of the quality of life with its style have a special significance among the elderly, although the path to high values of the quality of life of this group leads through the earlier stages of ontogenesis [Rejeski and Mihalko 2001].

In order to examine the correlation between the level of physical activity and the level of satisfaction with the quality of life in each of the four analyzed domains, the arithmetic mean and the standard deviation of the satisfaction level for each category were calculated in three groups of physical activity (Table 5).

The highest average level of satisfaction with the quality of life was observed for the social domain (86%) in the group of people with a high level of physical activity, the lowest for the physical domain in the group of respondents with insufficient level of physical activity. The average quality of life assessment for the physical, psychological and social domains is the highest for people with a high level of activity, while the lowest for those with an insufficient level of activity. For the environmental domain, the average degree of satisfaction is highest for rural residents with a sufficient level of physical activity (Table 5).

Distributions of satisfaction level for each domain divided into three groups of physical activity were tested with the Shapiro–Wilk test for normality of distribution. As a result of the tests, the hypothesis of normality of distribution for a few variables was rejected, which made it impossible to examine the significance of differences in arithmetic means between particular groups of a given level of physical activity with the Student's *t*-test.

To examine the significance of differences in the level of satisfaction with the quality of life for individual domains between groups with a given level of physical activity, the Mann–Whitney U test was used (Table 6). The test results indicate a statistically significant difference between the level of satisfaction with the quality of life in each of the domains in groups with sufficient and insufficient level of physical activity and with high and insufficient level of physical activity. In addition, a statistically significant difference was found in the environmental domain between groups with a high and sufficient level of physical activity.

Table 5. Arithmetic mean ($\bar{x}$) and standard deviation (*SD*) according to the level of physical activity and quality of life domain

Domains – BREF test	Physical activity – IPAQ test					
	high *N* = 51		sufficient *N* = 95		insufficient *N* = 28	
	$\bar{x}$	*SD*	$\bar{x}$	*SD*	$\bar{x}$	*SD*
	%					
Physical	74	16	71	14	61	16
Psychological	78	12	78	11	71	14
Social	86	12	85	14	81	16
Environmental	70	11	71	12	68	13

Source: The author's own research outcomes.

The next analyzed element of the lifestyle of the subjects are eating habits. The largest number of people (45.6%) consume three meals a day, the second place is taken by respondents consuming four meals (36.9%), 12.5% of people sit down to meals five times a day, and 2.5% of those surveyed consume two and seven meals.

The most commonly consumed both during the day and weekly product were raw vegetables and meat products, the least often – potatoes and groats. The largest variation among respondents was observed for the distribution of the number of weekly consumed groats and daily cooked boiled vegetables. The smallest dispersion was visible for the distribution of the number of meats and raw vegetables consumed weekly. It is worth noting that 25% of respondents consume up to once a week groats, three times cooked vegetables and at most four times a week meat, raw vegetables and potatoes (Table 7).

Almost half of the respondents consume vegetables produced in their own household. More than half (56%) of respondents do not have to buy eggs in the store (Table 8). Cottage cheese, butter and cream

Table 6. The level of physical activity and the quality of life of the rural respondents (results of Mann–Whitney U test)

Significance of differences between groups	Physical domain		Psychological domain		Social domain		Environmental domain	
	t-test	*p*	*t*-test	*p*	*t*-test	*p*	*t*-test	*p*
High – sufficient	–0.415	0.678	–1.459	0.145	–1.469	0.142	–2.044	0.041
Sufficient – insufficient	–7.998	0.000	–7.997	0.000	–6.746	0.000	–6.495	0.000
High – insufficient	–12.555	0.000	–9.944	0.000	–7.794	0.000	–5.932	0.000

Source: The author's own research outcomes.

Table 7. Statistical measures describing the distribution of the number of daily and weekly consumption of particular types of food

Food product	Frequency	Arithmetic mean	Factor of changebility	The first quartile	The second quartile	The third quartile
Meat	daily	1.38	0.48	1	1	2
	weekly	5.35	0.36	4	7	7
Meat products	daily	1.64	0.45	1	2	2
	weekly	5.74	0.33	5	7	7
Boiled vegetables	daily	1.42	0.68	1	1	1
	weekly	4.73	0.47	3	5	7
Fresh vegetables	daily	1.81	0.59	1	1	2
	weekly	5.51	0.37	4	7	7
Groats	daily	1.23	0.49	1	1	1
	weekly	3.40	0.68	1	3	6
Potatoes	daily	1.16	0.52	1	1	1
	weekly	4.99	0.40	4	5	7

Source: The author's own research outcomes.

Table 8. The origin of consumed food products – own cropping/production

Frequency	Consumption (%)					
	vegetables	cottage cheese	butter	sour cream	eggs	others
Always	49	8	7	16	56	28
Sometimes	27	13	7	8	11	21
Never	24	80	86	77	33	51

Source: The author's own research outcomes.

produces a small percentage of households surveyed. The respondents drink an average of 1.2 l of water per day, 0.6 l of tea, 0.4 l of coffee and 0.5 l of sweet drinks.

The generalized image of the diet of the subjects can be assessed positively. The determinants of this model are: 3–4 meals a day, a lot of raw vegetables, a balanced weekly dose of meat protein and more than 1 l of water a day.

CONCLUSIONS

As a result of the tests, the statistical significance of differences in the level of satisfaction in all areas of life between groups with sufficient and insufficient activity level and between groups with high and insufficient level of physical activity can be considered. In addition, statistically significant differences were also observed between the subgroup with a high and sufficient level of physical activity for the environmental domain. When comparing the arithmetic means calculated for particular subgroups, it can be concluded that the increase in the level of physical activity positively affects the level of satisfaction with the quality of life in all areas of life among the study group. Achieving a sufficient level of activity results in a significant increase in satisfaction with the quality of life. Differences between the sufficient and high levels are only visible in the environmental domain.

At the same time, respondents at risk of alcohol dependence (two and more indications in the Cage test) assess their own quality of life as lower than those surveyed in each domain. Pearson correlation coefficients calculated for the correlation between the results obtained in the Cage test and the quality of life levels in each domain have assumed negative values, which means that the more positive answers regarding the risk of alcohol dependence, the lower the quality of life of the respondents.

Consuming minimum four meals a day including raw vegetables, groats, potatoes and drinking more than 1 liter of water a day have an impact on the assessment of quality of life only in the physical domain. In the psychological domain, the average level of satisfaction of people using this model of nutrition is the same as the others. In the social and environmental domains, the average level of quality of life assessment is higher in the group of people using other eating patterns.

The surveyed inhabitants of the villages near Warsaw prove their insight into the importance of health-modeling factors, but they underestimate the negative value of stimulants. They also do not value the genetic influence on their own health. In modeling health, highly valued physical activity deserves attention.

The poll of the relationship of selected pro-health behaviors in the aspect of the subjectively rated quality of life clearly suggests the creation of an educational program aimed at properly applied and purposefully selected physical activity of rural residents. In addition to the importance of purposeful physical activity, the program should emphasize the right way of eating and the ability to respond to stress.

REFERENCES

Biernat, E., Stupnicki, R., Gajewski, A. K. (2007). Międzynarodowy Kwestionariusz Aktywności Fizycznej (IPAQ) – wersja polska [International Physical Activity Questionnaire (IPAQ) – Polish version]. Wychowanie Fizyczne i Zdrowotne, 6–7, 4–9.

Booth, F. W., Chakravarthy, M. V., Spangenburg, E. E. (2002). Topical Review. Exercise and gene expression: physiological regulation of the human genome through physical activity. Journal of Physiology, 543 (2), 399–411.

Cury, T., Ravenscroft, T. (2001). Countryside recreation provision in England: exploring a demand-led approach. Land Use Policy, 18 (3), 281–291.

Drewnowski, A., Evans, W. J. (2001). Nutrition, Physical Activity, and Quality of Life in Older Adults: Summary. The Journals of Gerontology, A, 56, (suppl_2), 89–94. DOI: 10.1093/gerona/56.suppl_2.89

Education, Audiovisual and Culture Executive Agency (2008). EU Physical Activity Guidelines. Recommended Policy Actions in Support of Health-Enhancing Physical Activity Approved by the EU Working Group "Sport & Health" at its meeting on 25 September 2008. Confirmed by EU Member State Sport Ministers at their meeting in Biarritz on 27–28 November 2008. Brussels.

Fortuna, M. (2012). Trening zdrowotny w wybranych chorobach kardiologicznych [Health training in selected cardiac diseases]. Karkonoska Państwowa Szkoła Wyższa, Jelenia Góra.

Haapanen-Niemi, N. (2000). Associations of Smoking, Alcohol Consumption and Physical Activity with Health Care Utilization. A Prospective Follow-up of Middle-aged and Elderly Men and Women. Acta Universitatis Tamperensis, 738. Tampere University, Tampere.

Holmberg, S., Swardsudd, K., Thellin, A. (2003). The impact of physical work exposure on musculoskeletal symptoms among farmers and rural non-farmers. A population-based study. Annals of Agricultural and Environmental Medicine, 10 (2), 179–184.

Janion, M. (2006). Profilaktyka pierwotna chorób układu krążenia [Primary prevention of cardiovascular diseases]. Studia Medyczne Akademii Świętokrzyskiej, 3, 114–115.

Kwilecka, M., Brożek, Z. (2007). Bezpośrednie funkcje rekreacji [Direct recreation functions]. Druk Tur, Warszawa.

Mogiła-Lisowska, J. (2010). Rekreacyjna aktywność ruchowa dorosłych Polaków [Recreational recreation of adult Poles]. Wydawnictwo Akademii Wychowania Fizycznego, Warszawa.

National Cancer Institute [n.d.]. Quitting is a Journey. Cleveland. Retrieved from https://smokefree.gov/ [accessed 15.02.2017].

Niedzielska, E., Leś, A., Kowalik, N. (2016). Wybrane zachowania zdrowotne w stylu życia pracowników spółki komunikacji medialnej [Selected health behaviors in the lifestyle of employees of the media communication company]. Turystyka i Rekreacja, 13 (1), 67–74.

White, M. P., Elliott, L. R., Taylor, T., Wheeler, B. W., Spencer, A., Bone A., Depledge, M. H., Fleming, L. E. (2016). Recreational physical activity in natural environments and implications for health: A population based cross-sectional study in England. Preventive Medicine, 91, 383–388.

Wojtasik, W., Szulc, A., Kołodziejczyk, M. (2015). Wybrane zagadnienia dotyczące wpływu wysiłku fizycznego na organizm człowieka [Selected issues regarding the impact of physical exercise on the human body]. Journal of Education Health and Sport, 5 (10), 350–372.

Wołowicka, L., Jaracz, K. (2001). Polska wersja WHOQOL-100. Instrukcja [The Polish version of WHOQOL-100. Instruction]. [In:] K. Wołowicka (ed.), Jakość życia w naukach medycznych [Quality of life in medical sciences]. Wydawnictwo Uczelniane Akademii Medycznej im. Karola Marcinkowskiego w Poznaniu, Poznań, 237–275.

Woźniak, M., Brukowicka, I., Kopański, Z., Kollar, R., Kollarova, M., Bajger, B. (2015). Zdrowie jako wypadkowa działania różnych czynników [Health as a resultant of the action of various factors]. Journal of Clinical Healthcare, 4, 1–3.

Xiao, H., McCurdy, S. A., Stoecklin-Marois, M. T., Li, C-S., Schenker, M. B. (2013). Agricultural work and chronic musculoskeletal pain among Latino farm workers: The MICASA study. American Journal of Industrial Medicine, 56 (2), 216–235.

Majchrzak-Jaszczyk, A., Pędraszewska-Sołtys, B., Mogiła-Lisowska, J., Bartnik, P. (2019). Lifestyle and its quality among residents of Warsaw suburban communes. Acta Sci. Pol. Oeconomia 18 (2), 59–68, DOI: 10.22630/ASPE.2019.18.2.19

STYL ŻYCIA A JEGO JAKOŚĆ WŚRÓD MIESZKAŃCÓW GMIN PODWARSZAWSKICH

STRESZCZENIE

Problematyka badań dotyczy poszukiwania związku omiędzy jakością życia ocenianą subiektywnie przez badanych a poziomem aktywności i czasem, jaki wykorzystują na nią mieszkańcy wsi podwarszawskich oraz na ile badani realizują tzw. zdrowy styl życia w zakresie korzystania z używek i sposobu odżywiania się. Zastosowaną metodą badawczą jest sondaż diagnostyczny. Wykorzystana technika to zwarty test international physical activity questionnaire (IPAQ) badający aktywność fizyczną, test Batterie rapide d'efficience frontale (BREF) weryfikujący jakość życia oraz wywiad autorskim kwestionariuszem wywiadu. Wyniki badań wśród mieszkańców podwarszawskich wsi wskazują na ich wiedzę w zakresie znaczenia czynników determinujących zdrowie. Jednocześnie badani nie dostrzegają negatywnego wpływu używek. Znaczące jest wskazywanie przez respondentów znaczenia aktywności ruchowej w kontekście utrzymania zdrowia. Po przeprowadzeniu badań wyłania się wiodący wniosek, iż istnieje potrzeba sformułowania programu edukacyjnego dla mieszkańców wsi, wskazującego na właściwe realizowanie poszczególnych elementów stylu życia.

Słowa kluczowe: styl życia, wieś, aktywność fizyczna, gminy podwarszawskie

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TOURISM CLUSTER IN THE SAILING OPERATIONS OF SMALL SEAPORTS IN POLAND

Piotr Nowaczyk✉

West Pomeranian University of Technology Szczecin

ABSTRACT

Despite an improvement in sailing conditions, the potential of Polish small seaports is not fully used. The limitations in the supply of sailing services, resulting from fragmentation and the reluctance of local tourism enterprises to cooperate are one of the main causes of such situation. The article uses methods of literature review, comparative analysis, and in-depth interview. A maritime cluster in Barcelona, whose creation ensured additional benefits for tourism enterprises, was selected for comparison. The condition for the success of the initiative was the involvement of public authorities in the organization and operation of the cluster. The increase in attractiveness of the Polish tourism sector should be sought in expanding the scope and quality of provided services. The first of the mentioned goals will require establishing close cooperation between tourist enterprises, while the latter entails competitive struggle. The cluster concept creates the possibility of simultaneous cooperation and competition. Creating a sailing cluster shall require support from public authorities.

Key words: sailing cluster, sailing tourism, sailing services, small seaports
JEL codes: R12, Z32

INTRODUCTION

There is a network of small ports located on the Polish coast. In the postwar period, sailing constituted a marginal area of their activity. The situation started to change once the political transformation began. Liberalization of border traffic, simplification of requirements for sailing on sea waters, and increase in the wealth of society, increased tourists interest in sailing. Accessibility of EU funds contributed to the development of nautical infrastructure on an unprecedented scale. Despite the favorable conditions, the sailing potential of ports is not fully used [Nowaczyk and Malkowski 2018]. The main reason behind this situation is not adjusting the services offer to the requirements and needs of the sailors. The fragmentation of the tourism sector and the reluctance to cooperate negatively impact the scope and quality of provided sailing services. Shortages in the supply of services reduce the interest of tourists in the sailing market. This mostly concerns foreign sailors, more sensitive to the quality of the tourist product. However, Polish sailors are also becoming more demanding, which often leads to them choosing sailing facilities abroad as their destinations. A self-perpetuating mechanism is created in which the low quality of a tourist product discourages sailors from using seaports, which in turn reduces the interest of tourist enterprises in the provision of sailing services. Additionally, internationalization of sailing forces the ports to recognize the international dimension of competition, which includes the Baltic Sea region but also part of the Mediterranean, especially the Adriatic coast [Klimek 2006, Sawicka 2010, Łapko 2015, Vujičić et al. 2017].

Piotr Nowaczyk https://orcid.org/0000-0001-8625-1959
✉piotr.nowaczyk@zut.edu.pl

The improvement in the situation of the Polish sailing sector should be achieved through close cooperation and competitive effort on the part of the tourism enterprises. A platform which facilitates simultaneous cooperation and competition is a sailing cluster. Therefore, the aim of this article is to elaborate a concept of a sailing cluster as a project aimed at increasing the tourist attractiveness of Polish seaports. The construction of the cluster will be based on theoretical premises and international experience while also taking into consideration the specificity of Polish conditions for the development of sailing.

Clustering is a relatively popular phenomenon in highly developed countries. Clusters are considered to be one of the main factors increasing the competitiveness of regions [Porter 2001, Gancarczyk 2010, Roman 2013]. However, despite the fact that nearly thirty years that have passed since the creation of the clustering concept, clusters of enterprises have not been fully researched [Gancarczyk and Gancarczyk 2011, Kłosiewicz-Górecka 2012]. Difficulties that researchers encounter result from the overall complexity and heterogeneity of enterprise clusters.

In Poland, clustering is a new phenomenon, although gaining more and more popularity [Skowronek 2015]. Most of the existing clusters are in the early stages of development.

The article uses methods of literature review, comparative analysis, and in-depth interview. A sailing cluster in Barcelona was selected as a reference for analysis. The respondents were CEOs of companies managing the seaports (seaport operators), CEOs of sailing associations, and owners of tourism enterprises.

The territorial scope of the research includes eight small seaports representing each section of the Polish part of the Baltic coast, i.e.: Dziwnów, Kołobrzeg, Darłowo, Ustka, Łeba, Władysławowo, Jastarnia, and Hel. The major part of the sailing traffic is concentrated there.

CLUSTERS – THEORETICAL ASSUMPTIONS

Historically, the first cluster structure was presented by Marshall in the 1990s. At that time, the term used was industrial district. However, the concept of clusters was only more widely applied in the late twentieth century thanks to Porter. According to the author [2001], clusters are: "geographic concentration of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate". It should be noted that it is not the only definition of a cluster, but perhaps the most universal one, often quoted in academic works.

From the very beginning, clusters were a business project aimed at increasing management effectiveness. They were an answer to globalization and increasing competition. It is thus not coincidental that Porter's theories gained recognition in the USA – a country with a liberal model of capitalist economy – in the 1980s, so in the period of widespread deregulation and privatization.

The business character of clusters meant that in conceptual assumptions particular attention was paid to the economic calculation. The most important issue was the proper location, in which the source of competitive advantage was sought. The location attractiveness of regions was dependent on: classic production factors, sophisticated demand, presence of related sectors, and the context of strategies and competition. An especially significant element of clusters is a mutual network of links between specialized suppliers and enterprises from related sectors. Connections occur both horizontally – between competing companies, and vertically, i.e. between enterprises from various parts of the production process, e.g.: specialized suppliers, producers, distributors, and sellers. The complex structure of clusters makes them useful in situations when meeting the needs requires a creation of a product and offering a service in a comprehensive manner.

Considering the location attractiveness of regions as understood by Porter it should be stated that the driving power behind the development of clusters which at the same time determines their position on the market is competition, which is fostered by high expectations of customers and conditions enabling fair competition. Moreover, Porter believed that building clusters from the ground up in places deprived of elementary location advantage was inefficient and a waste of valuable resources. The results of the actions undertaken are

difficult to predict and may not bring the expected results. The choice of proper location is thus essential for the clusters to gain competitive advantage [Fujita et al. 2000, Porter 2001].

Clusters are composed not only of enterprises, but also other entities, mainly: public authorities, universities, scientific and research units, and business environment institutions. An especially important role in the development of clustering is played by public authorities, who should initiate the creation of new clusters and strengthen the existing ones. Due to the market nature of Porter's theories, the engagement of public authorities should be limited to supporting the development of clustering. The authorities should act as an animator, but never a constructor of clusters. The above statement is based on the conviction that endogenous factors are behind the premises of development of clusters. Therefore, clusters should be created through "bottom-up" initiatives, i.e. on the initiative of enterprises themselves, which increases the chance of achieving success. Public authorities cannot favor selected clusters or individual enterprises in clusters [Porter 2001, Olejniczak 2003].

Clusters often form a formalized organizational structure, headed by a governing entity [Porter 2001, Kusa 2008]. Coordination of clusters' activities is particularly recommended in cases of numerous misunderstandings which may occur between enterprises, and weaknesses of connections, which in turn are a consequence of reluctance to cooperate. The organized structure of the clusters is a discussion forum on which the clusters' problems are revealed, which allows to deal with them more effectively.

As it has already been mentioned, proper location is a prerequisite for the emergence and subsequent development of clusters. The benefits from their operation are related to the geographic proximity of enterprises [Andrejic Bengtsson and Kock 2000, Porter 2001, Palmen and Baron 2008, Łącka 2018]. The idea behind the operation of clusters is an assumption that the benefits from clustering of enterprises exceed the advantages of enterprises from an isolated location and large vertically integrated enterprises. The main source of clusters' advantage is the possibility of simultaneous competition and cooperation. Although large enterprises, e.g. transnational companies, can be parts of clusters, smaller entities should dominate in clusters due to their natural tendency to compete.

The geographical proximity makes it easier to compare the results achieved in the clusters, which, combine with the will to gain competitive advantage, enforces pro-developmental actions. Enterprises compete with each other for the quality of manufactured products, the source of which is innovation. The cost advantage is difficult to achieve due to the fact that enterprises use similar resources with comparable costs of acquisition.

Enterprises compete mainly for sales markets, and thus for consumers. However, there are areas of activity in which cooperation is possible, i.e. supply, training activities, legal services, market research, raising capital, and marketing activities. Joint undertaking of the aforementioned activities reduces unit costs, as it allows the distribution of total costs to a larger number of enterprises. Actions undertaken by more members increase the negotiating power in the economic environment, and lower unitary costs.

Apart from the possibility of simultaneous competition and cooperation with the activity of clusters, there are also many other benefits. Clusters contribute to a more efficient allocation of workplace, setting prices at a level reflecting the market value of products, are conductive to creating innovative solutions and accelerating their diffusion and facilitating access to information. Trust, which is a consequence of long-term cooperation, reduces transaction costs and specialization, in turn, increases the quality of products and increases work efficiency.

The concept of clusters can be applied to all branches of economy. This equally concerns the maritime sector. Clustering in the maritime sector is gaining in popularity. Over 1,000 clusters have been identified in Europe [ECCP n.d.]. Maritime cluster is usually defined as "a network of enterprises, science institutions, universities, and local governments, local and central administration, working together for the added value of maritime industries" [Misztal 2010]. The above definition – like Porter's concept of clusters – emphasized the network of connections, actors of the clusters, and the objective, which is the synergy effect. The maritime clusters consist of three basic functional areas, i.e. traditional sectors of maritime activity (ship-

ping, shipbuilding, seaports and other maritime activities); maritime tourism and recreation, as well as sea fishing. The sailing tourism sector can thus be one of the elements of a bigger whole, i.e. a maritime cluster. On the other hand, we can speak of a "purely" maritime cluster when the network of connections consists of entities closely related to the maritime tourism sector. A maritime cluster can thus be defined as "a geographical aggregation of mutually connected maritime enterprises and entities supporting the activity of the sailing sector, especially public authorities, universities, science and research units, tourist associations, and business environment institutions, acting together on behalf of acquiring added value in sailing tourism". The most important links of the cluster are sailing marinas, shipbuilding and renovation yards, and yacht charterers. however, a maritime cluster can include a wider circle of tourist enterprises providing services for yachts and sailors[1]. In Europe, sailing clusters are particularly popular in countries with a long tradition of maritime tourism, i.e. in Italy, Spain, Greece and France [ECSIP 2015].

MARITIME CLUSTERS IN PRACTICE – EXAMPLE OF THE MARITIME CLUSTER IN BARCELONA

The Barcelona cluster, called Barcelona Clúster Nàutic, was created in 2013. It is managed by Barcelona Clúster Nàutic, a non-profit organization established by the city authorities and the public port in Barcelona. The cluster comprises nearly 90 members representing various trades, united by a common objective which is the development of sailing [Barcelona Clúster Nàutic 2017].

The most important link of the cluster are three yacht marinas with 1,552 berths. Numerous enterprises offering a wide range of services for yachts and sailors are connected with the operations of the marinas. Sport clubs and sailing schools operate in the port. The mentioned service providers use the offer of transportation, marketing, insurance, consulting, legal, and energy companies. There are also business operating in the port whose profiles are not strictly connected with sailing: catering, accommodation, commerce. Tourists have a water sports center at their disposal, fitted with an aqua park and a gym. Information system about the services offered by the cluster and tourist attractions of the city and region, including the existing marina network in the region of Catalonia, is strongly developed. The activity of the cluster is supported by public authorities, universities, science and research units, and business environment institutions.

While analyzing the maritime cluster in Barcelona, a question should be posed: what benefits does it offer to its members? After all, tourism enterprises could offer sailing services without participating in a formalized structure. However, a cluster generates benefits not only for its members, but also for the city and the region. The engagement of public authorities in the activities of the cluster reinforced the promotion of sailing. Legislative lobbying has simplified the law, reduced formalities and made procedures more flexible. The education system was adjusted to the needs of the cluster to a larger degree. The organized sailing courses raised the qualifications of the personnel. Connections with schools of higher education and science and research units allowed to be better adjust the service offer to the changing trends on the sailing market.

The actions of public authorities contributed to an increase in the supply of services as well as a bigger concentration of service providers, consequently increasing the competitive pressure. The information system has a great merit in improving the service offer. The knowledge of the tourist about the sailing product improved the efficiency of decision making. This forced tourism enterprises to care more about their customers. Information about sailing services is not limited to the port on Barcelona, but it covers the entire regions, impacting the operation of the 44 marinas located along the 780 km of the Catalan coast.

The cluster contributed to expanding the scope of provided services. The ability to comprehensively meet the sailing needs has increased the popularity of the port – especially for the largest yachts, thus guaranteeing the demand for specialized services.

[1] More on members of a maritime cluster in the section devoted to the activity of the port in Barcelona.

POSSIBILITIES OF USING CLUSTERS IN THE DEVELOPMENT OF SAILING TOURISM IN COASTAL AREAS IN POLAND

The conducted research shows that in the studied seaports the scope and quality of provided sailing services vary (the table). The majority of them provides a safe exit and a possibility of mooring yachts by special wharfs and floating bridges. Sailors have access to a water and energy infrastructure, sanitary facilities, and utility rooms. In almost all the ports, there are catering and sports and recreation services provided[2]. However, the latter are limited to one event a year in the case of sailing regatta. Similarly, most ports provide yacht wintering. In every other port sailors can use maintenance and accommodation services. The situation is not the best when it comes to yacht charter – only three ports provide such services. The biggest deficiencies are associated with fuel supply. The quality of services provided on the basis of sailing infrastructure is at a high level, which is a consequence of the recent modernization of sailing facilities. The quality of accompanying services is more diversified.

One should very careful while comparing the Barcelona agglomeration and the large, international Barcelona port with the towns and local ports situated along the Polish coastline. However, having accounted for the above condition, numerous differences can be noticed in the operation of the

Table. Sailing services offered in small seaports in 2019

Port	Bathroom facilities and utility rooms	Service facilities	Yacht chartering	Wintering	Fuel distributor	Base		Recreation and sports services
						catering	hotels	
Dziwnów	+ good	–	–	+ good	–	+ good	–	organized good
Kołobrzeg	+ good	+ average	+ average	+ good	+ good	+ average	–	organized average
Darłowo	+ good	+ average	+ good	+ average	+ average	+ good	+ average	organized good
Ustka	+ good	+ good	+ good	+ average	–	–	–	limited scope average
Łeba	+ good	–	–	+ good	–	+ good	+ good	–
Władysławowo	+ average	–	–	–	–	+ good	+ good	limited scope average
Jastarnia	+ good	+ good	–	+ good	–	+ good	+ average	organized good
Hel	+ good	–	–	–	–	+ good	–	limited scope average

Explanation: + service provided; – service not provided; average, good – quality of service.

Source: Own study on the basis of conducted research.

[2] The recreation and sport services include the organization of sailing regatta, sporting events, sea shanties concerts, etc.

Polish sailing sector. The biggest problem is the insufficient engagement of tourism enterprises in sailing activity. In the respondents' opinion, the reasons for the situation should be seen in the reluctance of the fragmented tourist sector to cooperate and in the lack of experience in organizing clusters and, consequently, in insufficient knowledge about the benefits they offer. Similarly, no network of connections formed between tourism enterprises and public authorities, science and research units, and business environment institutions. The last barrier is the limited access to tourist information. If information is provided, it concerns individual sailing facilities. A comprehensive system of information on a network of yacht marinas is lacking. It is very important in the context of raising the quality of sailing services. Meeting the needs of sailors – depending on the port – requires from a few to several tourism enterprises. In smaller ports, the volume of sailing traffic can be insufficient to enter into competitive struggle, indispensable for the constant improvement of the sailing product. In such a situation, competition between tourism enterprises has to concern a network of marinas.

A remedy for the shortages of the tourism sector could be the creation of a maritime cluster. The condition for the success of any cluster initiatives is that the given location has a competitive advantage. It should be noted that in the case of a maritime clusters, locations are determined by seaports, so it is imposed in advance. Creating a cluster in less attractive locations would deprive the undertaking of the elementary competitive advantage at the very beginning. The more so because in the recent period a comprehensive modernization of the nautical infrastructure took place. The location advantage of seaside areas is also connected with the operation of numerous tourism enterprises, most of them based on local capital. Moreover, sailing has been gaining in popularity. What is most important, sailing tourism is especially predestined to enterprises clustering into a large economic entity [Luković 2012]. The sailing tourism product is heterogeneous, i.e. comprises many different kinds of services. The researched areas thus possess the necessary conditions for the creation of a cluster.

It seems that without the support of public authorities, overcoming the barriers which impede the development of clustering will be difficult. Therefore, creating a sailing cluster will require public authorities to take actions aiming at increasing the awareness of the benefits from the creation of a sailing cluster among tourism enterprises, encouraging tourism enterprises to participate in cluster initiatives, and developing the network of cooperation in the sailing sector. The next step should consist in formalization of the cluster structure, i.e. the establishment of a managing entity. The experience of Barcelona and many other cluster initiatives indicate that strong leadership is an essential factor of cluster development or sometimes even their creation [Jackson and Murphy 2006, Novelli et al. 2006].

As mentioned, a sailing cluster should include a network of ports instead of individual objects, which is connected with a larger number of service providers and thus more intense competition[3]. This will require universal access to comprehensive information on the locations of individual ports, and the scope and quality of services provided by tourism enterprises.

As far as the construction of the cluster is concerned, the main link should include operators of sailing infrastructure, around which business providing complementary services would be focused, e.g. servicing and chartering of yachts, gastronomy, accommodation, recreation and entertainment, fuel supply. Competing, i.e. providing the same services enterprises would create horizontal connections. Vertical connections would be made between enterprises from various links of the production process. And so in the case of port operators, the suppliers could be entities providing services in periodic inspections of sailing infrastructure, collection of waste from yachts, supply of energy, water, and utilities.

[3] Despite the fact that there are three competing yacht marinas in the Barcelona port, the maritime cluster cooperates with numerous marinas scattered along the Catalan coast.

The problem of tourism grown in the Baltic Sea region is the seasonality of sailing traffic limited to summer months. That is why in some foreign seaports – like in Barcelona – in order to minimize the negative consequences of seasonality, additional tourist attractions are offered, e.g.: spa, massage salons, conference rooms, shopping malls, apartments and houses on the water [Łapko 2015]. The possibility of offering similar services should also be considered in Polish conditions.

Creating a sailing cluster from enterprises representing many complementary sectors would expand the scope of provided services. Mutual competition would have a positive impact on the quality of sailing services. The formalized structure of the cluster, apart from initiating cooperation, would lower the costs of marketing and supply. Geographical proximity would accelerate the flow of information about new trends and changes on the sailing tourism market.

Engagement of public authorities in the process of cluster development should be most intense in the initial stages of its construction. Once the cluster reaches the so-called critical mass enabling its self-development, the participation of public authorities should be limited to solving current problems and supporting innovation processes.

Apart from public authorities, science and research units, tourist associations, and business environment institutions should also be involved in the development of the cluster. It is necessary due to numerous "shortages" of the local sailing sector. Of special importance is support in the area of legal services, acquisition of capital, market research, and trainings.

CONCLUSIONS

The main objective of clustering is improving the competitive position of enterprises. The condition of its achievement is proper location. Clusters generate numerous benefits and reduce operation costs, which as a result gives them an advantage over free location and large, vertically integrated businesses. They are useful in situations when meeting the needs requires creating a product or offering a service in a comprehensive manner.

Cluster initiatives are successfully used in the global sailing tourism sector. Barcelona Clúster Nàutic analyzed in the article provides numerous benefits to tourism enterprises. The active role of public authorities led to increased demand for sailing services, which resulted in an increase in sailing traffic. The joint coexistence of cluster members strengthened the negotiating power with the economic environment. Promotion and information system increased the knowledge of tourists about the sailing market in the region.

There are conditions on the Polish coast to create a sailing cluster. The sector of tourism enterprises, however, largely consists of local capital entities with limited resources and providing single tourist services. As research has shown, the scope of provided services is incomplete and does not satisfy the diversified needs of the sailors. The recipe for improving the situation may be establishing close cooperation between tourism enterprises, based on the concept of a maritime cluster. A barrier to its creation is the limited interest of tourism enterprises in the market of sailing services as a result of reluctance to cooperate and lack of experience in organizing clusters.

Overcoming development barriers will require the involvement of public authorities. Activities should aim to increase awareness in the tourism sector about the benefits of creating a sailing cluster, creating preferential conditions for enterprises taking part in cluster initiatives and supporting the development of the network of cooperation.

Drawing from the experiences of Barcelona Clúster Nàutic a managing body with broad decision-making prerogatives should be established. Its main objective should be the coordination of the activities of enterprises forming the cluster. The main link of a sailing cluster should be formed by sailing infrastructure operators, around which enterprises providing complementary services would be concentrated. Consideration should be given to expanding the sailing product with additional services, which would reduce the negative consequences of the seasonality of tourist traffic. A sailing cluster should include a network of yacht marinas. Such a construction will require universal access to information on the location of sailing facilities as well as on the scope and quality of tourist services provided.

REFERENCES

Andrejic Bengtsson, M., Kock, S. (2000). Coopetition in Business Networks – to Cooperate and Compete Simultaneously. Industrial Marketing Management, 29 (5), 411–426.

Barcelona Clúster Nàutic (2017). The marine industry, Barcelona's economic engine. Press Kit. Retrieved from http://www.barcelonaclusternautic.cat/uploads/press_dossier/dossiereng17.pdf [accessed 31.05.2019].

European Cluster Collaboration Platform [n.d.]. List of Cluster Organisations. Retrieved from https://www.clustercollaboration.eu/cluster-list [accessed 31.05.2019].

European Consortium for Sustainable Industrial Policy (2015). Study on the competitiveness of the recreational boating sector. Report for DG Enterprise and Industry. Rotterdam–Brussels.

Fujita, M., Krugman, P., Venables, A. (2000). The Spatial Economy. Cities, Regions and International Trade. MIT, Cambridge.

Gancarczyk, J. (2010). Wpływ klastrów na aktywizację gospodarczą regionów turystycznych [Impact of clusters on economic activation of tourism regions]. Acta Sci. Pol. Oeconomia, 9 (4), 106–107.

Gancarczyk, M., Gancarczyk, J. (2011). Wzrost i internacjonalizacja przedsiębiorstw w klastrach [Growth and internationalization of enterprises in clusters]. Organizacja i Kierowanie, 3 (146), 59–60.

Jackson, J., Murphy, P. (2006). Clusters in Regional Tourism. An Australian Case. Annals of Tourism Research, 33 (4), 1018–1035.

Klimek, H. (2006). Konkurencyjność polskich portów morskich na bałtyckim rynku usług portowych [Competitiveness of Polish seaports on the Baltic market of port services]. Studia Gdańskie. Wizje i Rzeczywistość, 3, 124–126.

Kłosiewicz-Górecka, U. (2012). Klastry – idea i praktyka w Polsce [Clusters – idea and practice in Poland]. Handel Wewnętrzny, 1, 3–11.

Kusa, R. (2008). Uwarunkowania rozwoju klastrów turystycznych [Determinants of the development of tourist clusters]. [In:] B. Godziszewski (Ed.), Zarządzanie organizacjami w gospodarce opartej na wiedzy: kluczowe relacje organizacji w gospodarce opartej na wiedzy [Organization management in a knowledge-based economy: key organization relationships in a knowledge-based economy]. TNOiK, Toruń, 517–518.

Łącka, I. (2018). Industrial clusters as a device of stimulation of cooperation and innovation of small and medium-sized enterprises in the area of bio-economy. Acta Sci. Pol. Oeconomia, 17 (2), 74–76.

Łapko, A. (2015). Turystyka żeglarska [Sailing tourism]. Bel Studio, Warszawa.

Luković, T. (2012). Nautical Tourism and its Functions in the Economic Development in Europe. [In:] M. Kasimoğlu (Ed.), Visions for Global Tourism Industry – Creating and Sustaining Competitive Strategies. In Tech, Rijeka, 416–418.

Misztal, K. (2010). Organizacja i funkcjonowanie klastrów portowych [Organization and functioning of port clusters]. [In:] K. Misztal (Ed.), Organizacja i funkcjonowanie portów morskich [Organization and functioning of seaports]. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 238.

Novelli, M., Schmitz, B., Spencer, T. (2006). Networks, clusters and innovation in tourism: A UK experience. Tourism Management, 27, 1150–1151.

Nowaczyk, P., Malkowski, A. (2018). Revitalization of degraded port areas as a chance for local development on the example of Kołobrzeg municipality. [In:] T. Studzieniecki, M. Kozina, D. S. Alilovic (Eds.), In Economic and Social Development – Book of Proceedings. Varazdin Development and Entrepreneurship Agency, Koprivnica, 582.

Olejniczak, K. (2003). Apetyt na grona? Koncepcja gron oraz koncepcje bliskoznaczne w teorii i praktyce rozwoju regionalnego [Appetite for grapes? The concept of clusters and synonymous concepts in the theory and practice of regional development]. Studia Regionalne i Lokalne, 2 (12), 55–76.

Palmen, L., Baron, M. (2008). Przewodnik dla animatorów inicjatyw klastrowych w Polsce [A guide for animators of cluster initiatives in Poland]. PARP, Warszawa.

Porter, M. E. (2001). Porter o konkurencji [Porter about competition]. PWE, Warszawa.

Roman, M. (2013). Klastry jako forma współdziałania w działalności turystycznej [Clusters as a form of cooperation in tourist activities]. Zarządzanie i Finanse, 11 (1), Part 3, 309–320.

Sawicka, J. (2010). Determinanty konkurencyjności polskiego sektora rolno-żywnościowego – rola popytu turystycznego [Determinants of polish agro-food sector competitiveness – the role of tourism demand]. Acta Sci. Pol. Oeconomia, 9 (4), 451–452.

Skowronek, E. (2015). Klaster jako forma współpracy w turystyce [Cluster as a form of cooperation in tourism]. Europa Regionów, 24, 129–140.

Vujičić, S., Mohović, D., Mohović, R. (2017). A Model of Determining the Closest Point of Approach Between Ships on the Open Sea. Promet – Traffic & Transportation, 29 (2), 225–232.

Nowaczyk, P. (2019). Tourism cluster in the sailing operations of small seaports in Poland. Acta Sci. Pol. Oeconomia 18 (2), 69–77, DOI: 10.22630/ASPE.2019.18.2.20

KLASTER TURYSTYCZNY W DZIAŁALNOŚCI ŻEGLARSKIEJ MAŁYCH PORTÓW MORSKICH W POLSCE

STRESZCZENIE

Pomimo poprawy warunków do uprawiania żeglarstwa potencjał turystyczny małych portów morskich w Polsce nie jest w pełni wykorzystywany. Jednym z głównym powodów są ograniczenia w podaży usług żeglarskich, wynikające z rozdrobnienia oraz niechęci do współpracy lokalnych przedsiębiorstw turystycznych. W artykule wykorzystano metody przeglądu literatury, analizy porównawczej oraz wywiadu pogłębionego. Do porównania wybrano klaster żeglarski w Barcelonie, którego utworzenie zapewniło dodatkowe korzyści przedsiębiorstwom turystycznym. Warunkiem powodzenia inicjatywy było zaangażowanie się władz publicznych w organizację i działalność klastra. Zwiększenia atrakcyjności polskiego sektora żeglarskiego należy upatrywać w poszerzeniu zakresu oraz poprawie jakości świadczonych usług. Pierwszy z wymienionych celów będzie wymagać nawiązania ścisłej współpracy między przedsiębiorstwami turystycznymi, a drugi wiąże się z podjęcia walki konkurencyjnej. Możliwość jednoczesnej współpracy oraz rywalizacji stwarza koncepcja klastra. Utworzenie klastra żeglarskiego będzie wymagało wsparcia ze strony władz publicznych.

Słowa kluczowe: klaster żeglarski, turystyka żeglarska, żeglarskie usługi turystyczne, małe porty morskie

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DEVELOPMENT OF NATIONAL PENSION SYSTEMS IN UKRAINE AND POLAND

Agnieszka Parlińska[1] ✉, Volodymyr Rudyk[2] ✉

[1] Warsaw University of Life Sciences – SGGW
[2] Podilsky State Agrarian Technical University

ABSTRACT

Poland and Ukraine have experienced a demographic crisis, increased financial burden on the able-bodied population and employers in terms of financing retirement age. Therefore, there was a need to reform the national pension systems in accordance with modern requirements of society and the need for social protection of retirement age citizens. The paper is dedicated to compare peculiarities of the formation and development of the national pension systems of Ukraine and Poland. Also the possibility of using the experience of both countries in the further implementation of the pension reform was discussed.

Key words: national pension system, pension reform, demographic sphere, population aging, retirement age, pension

JEL codes: J1, H55

INTRODUCTION

The countries of Eastern Europe in the area of pensions solve problems that are characteristic all of them. Over the past decades, these countries have experienced a demographic crisis, increased financial burden on the able-bodied population and employers in terms of financing retirement age, there is a tendency towards an increase in the proportion of pensioners in the total population. Therefore, there was a need to reform the national pension systems in accordance with modern requirements of society and the need for social protection of retirement age citizens.

Eastern European countries, using their pension insurance principles, have used their multi-level national pension models in modern conditions. Taking into account that the data of the countries, as well as Ukraine, passed the way of reforming their national economies from the planning-directive to the market, the formation of financial systems is carried out on similar models. It is important to study the experience of implementing the use of accumulative pension programs in Eastern Europe. Among Eastern European countries, Poland became one of the first pension reform. Therefore, it is interesting to study the reform of the national pension systems of both countries, their formation in modern conditions and the possibility of using positive developments of each of them. [Parlińska and Rudyk 2019].

In examining this issue, it should be noted that today, the main developers of pension reform models in the world are organizations such as the International Labour Organization (ILO) [Convention 1952] and the Organization for Economic Co-operation and Development (OECD) [Convention 1960], which are the main ideologues and pension and social policy strategists in the world. The International Monetary Fund (IMF) and the World Bank, which include two financial

Agnieszka Parlińska https://orcid.org/0000-0001-6640-3097; Volodymyr Rudyk https://orcid.org/0000-0001-9011-4543
✉agnieszka_parlinska@sggw.pl; rudyk_vk@meta.ua

institutions – the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA), play the leading role in reforming the pension system in different countries. These international financial organizations provide financial support to the reform processes, including in Poland and Ukraine [McTaggart 2001; USSSA 2014].

Adaptation of foreign developments to the conditions and specifics of financial science in Poland and Ukraine is of considerable scientific and practical interest and requires special research in the field of pensions. The main aspects of the functioning of pensions in both countries, the analysis of the problems and features of the functioning of the joint pension system and non-state pension provision, as well as the possibility of introducing a mandatory funded pension program are covered in the scientific works; for example: E. Libanova, L. Tkachenko, O. Koval, S. Onyshko, N. Goryuk, S. Naumenkova. However, the new requirements of the society to the pension system, the dynamic changes in the economic, financial, and demographic spheres necessitate their further research.

MATERIAL AND METHODS

The Ukrainian pension system has not yet been fully formed, in accordance with the current pension legislation of the country. Practical application, for today, does not have its second level – a compulsory accumulative pension system. The non-state pension system, which forms the third level of the national pension system, is not in high demand among the population. Citizens do not have sufficient confidence in using it. The entire financial burden has assumed a solidarity pension system, but it is no longer able to effectively finance its level.

The experience of Poland in building its national pension system may be useful for Ukraine regarding the use of redistributive and accumulative pension programs, the activities of the main financial institutions in the pension sector, the mechanism for payment of pension insurance contributions, and the protection of pension assets of the population. His consideration would contribute to the development of a set of measures and their implementation at the current stage of pension reform in Ukraine.

The aim of research was to compare peculiarities of the formation and development of the national pension systems of Ukraine and Poland at the present stage of development of society and the possibility of using the experience of both countries in the further implementation of the pension reform. It should be pointed out that in Poland farmers have separate pension system which was not subject of this research.

The data about theoretical and financial issues were taken from the official sources: the applicable literatures, legal acts, Polish and Ukrainian pension funds, central statistical offices of Poland and Ukraine, World Bank and Eurostat. The descriptive and comparative statistical methods were used in the research paper in order to analyse the problem from the economic point of view.

RESULTS AND DISCUSSION

Ukraine, while building its national financial model, highlights the social protection of the population among the main priorities. It is considered to be a decisive guideline for the development of socio-economic relations in society, enshrined at the legislative level and involves the formation of quality standards for all citizens. The level of well-being of citizens of retirement age depends to a large extent on the state and capabilities of the existing national pension system.

The modern national pension system of Ukraine began to be formed in the early 1990s of the twentieth century. In accordance with the current legislation, the structure of the pension insurance system in Ukraine includes three levels and is formed by the mandatory state pension insurance and voluntary additional pension insurance.

The three-tier pension system should distribute the risks associated with unfavourable demographic trends in society and fluctuations in the economy and the financial market between the three components. According to scientists, such a distribution of risks will make the pension system more financially balanced and sustainable, which insures workers from lowering the total income after retirement and is fundamentally important and beneficial to them.

The solidarity pension system provides for retirement benefits, which are mainly made at the expense

of contributions of working citizens of the country and their employers. Persons who have a low insurance record and the amount of earnings from which insurance premiums were paid, and hence low pensions, provides for the provision of targeted social assistance. This will allow them to provide income at the level of minimum social standards in Ukraine, established by law.

In the reformed solidarity system, the size of the pension depends on the size of the wages from which the insurance contributions were paid, and the length of service during which they were paid. The mechanism of accrual of pensions involves the use of the system of personified accounting of information about earnings and payment of insurance premiums by citizens. The maintenance and servicing of such a system is carried out by the Pension Fund of Ukraine.

Creation of the second level of the national pension model will mean the introduction of a system of compulsory accumulative pension insurance in our state.

The main content of such a system is that part of the mandatory contributions to the pension system will be accumulated in a single Accumulation Fund and will be accounted for on the individual accumulative pension accounts of citizens who will pay these contributions. The funds of the accumulation pension system will be invested in the country's economy in order to obtain investment income and protect them from inflationary processes. In order to manage pension funds, asset management companies will be selected on a competitive basis, which will be issued the relevant licenses, and the state will control their activities. The investment of pension assets of the company will be carried out in accordance with the requirements of domestic legislation in this area, as well as in accordance with requirements for diversification of investment investments.

Pension asset management companies will instruct the custodian bank to directly hold pension assets, and it will be responsible for the targeted use of these funds. Pension assets will be the property of citizens who are members of the accumulation pension system and will be accounted for on their individual accumulative retirement accounts. Pension payments from the Accumulation Fund will be made additionally to payments from the joint-stock system.

The second level has not yet been found practically applied in the domestic pension model, as the corresponding macroeconomic conditions have not been formed, and its legal base continues to emerge. In addition, the financial crisis that manifests itself in society does not contribute to its effective implementation.

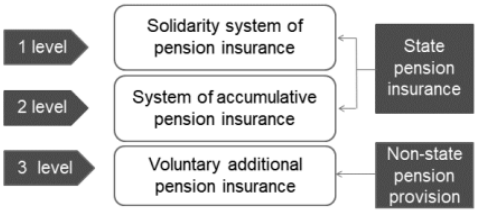
The third level of the pension system forms the system of non-state pension provision. It is created to create additional pension savings at the expense of voluntary contributions from individuals and employers. The main financial institutions that operate on the third level, according to the current legislation, are non-state pension funds (NPFs), insurance organizations and banking institutions.

The functioning of the first and third levels shows that the existing system of pension insurance does not perform its tasks correctly, and as a result, pensions generally do not allow them to maintain a minimum standard of living, do not protect themselves from poverty. It remains socially unfair both on a professional and on a gender basis. Society was not able to completely disinfect earnings and income in general.

Poland, becoming a member of the EU, is trying to achieve international standards in the field of pensions, which is provided by the International Labour Organization [Convention 1960]. To do this, she had to some extent change her pension system model, adapting it to new conditions, which requires the market and the general legal provisions of the European Union to save income after termination of employment, provision of a living wage for all incapacitated people and compulsory accumulation of old age all citizens of working age.

The pension model, which is being formed in Poland, involves several levels of pension provision for its population (the figure). It uses distribution and cumulative types of pension programs. Already during the 1990s of the twentieth century. this country, like most developed European countries, has concluded that a state pension can provide only a living wage. Under current conditions, distributive pension programs cannot fully meet the financial needs of retirement age people. In connection with this, there is a need to introduce accumulative pension schemes.

Ukraine



Poland

Criteria for classification of three old-age pension pillars

Criteria for classification	first pillar	second pillar	third pillar
Status of the scheme	statutory	statutory	supplementary
Participation in the scheme	compulsory	compulsory	voluntary
Social objective	basic level of benefits	basic level of benefits	higher level of benefits
Scheme management	public	private/ public	private
Benefits financing	from current contributions	capital and from current contributions	capital

Fig. The structure of the pension insurance system in Ukraine and Poland

Source: Law of Ukraine on mandatory state pension insurance of 2003, Social Insurance Institution of Poland [2017].

Among the countries of Eastern Europe, Poland was one of the first to introduce a compulsory cumulative pension system. The new mixed pension insurance system was introduced on 10 April 1999. It is mandatory for those born 1 January 1969 or later, and voluntary for those born after 1 January 1949. In accordance with its national legislation, all able-bodied people under the age of 30 years since 1999 began to participate in accumulative pension programs in a compulsory manner. Citizens aged of 31–49 can participate in the accumulation system in a voluntary form. Employees over the age of 50 remain in the solidarity pension system. All levels of the Polish pension system complement each other and reinsure each other.

The first level involves the formation of a minimum guaranteed pension, the second – forms the basic solidarity pension. At the third level, the compulsory accumulation system begins to operate. The third pillar is a tax qualified corporate pension scheme (Pracownicze Programy Emerytalne, PPE). From 2019 in terms of the third pillar, new Auto Enrollment Pension Plans (Pracownicze Plany Kapitałowe, PPK[1]) will be introduced. Studies have shown that the first two levels of the Polish pension system are administered by the state and the third is in non-state governance. However, the peculiarity of this level is that insurance premiums are collected by the state pension administrator, which then distributes between non-state pension funds [USAID 2010, Parlińska 2017].

An important study of the national pension systems of Poland and Ukraine is the analysis of retirement age and the size of insurance pension contributions, their distribution among employees and employers (Table 1). In Ukraine, they pay the single social contribution, which has been reduced to 22% for employers from 2017. In 2018, he was left for them at the same level. Employees pay a contribution of 5%.

In Poland, the pension insurance premium is 19.52% of the gross wage. This amount is divided into half, one half is paid by the employee and the other is the employer. Till end of the April 2011 the pension insurance premium in Poland was paid in the following amounts:

[1] Companies will be obliged to offer PPK and contribute at least 1.5% of the individual total salary. Companies with more than 250 employees will be covered by new legislation as of January 2019, and for companies with 50–250 employees as of July 2019. Under certain circumstances, the new PPK plans will work as an auto enrollment model. However, companies offering PPE will not be forced to set up PPK. In order to maintain this exception, the employer contribution in PPE will have to be at the level of 3.5% of individual total salary. PPK assets will be managed by private investment fund companies as well as dedicated governmental institution (s) because the Polish model follows UK Auto Enrollment and NEST, the National Employment Savings Trust concept.

Table 1. The retirement age, the insurance record and the amount of insurance pension contributions in Poland and Ukraine

Index	Ukraine		Poland	
	men	women	men	women
Retirement age	60	58.5	65	60
Insurance experience (years)	25	20	25[a]	20[a]
Insurance pension contributions (%)	27.0	27.0	19.5	19.5
Paid by employers (%)	22.0	22.0	9.8	9.8
Paid by employees (%)	5.0	5.0	9.8	9.8

[a] The old-age pension is brought up to the amount of the minimum pension if the insured person: being a man – has reached the statutory retirement age and has completed a contributory and non-contributory period of at least 25 years, or being a woman – has reached the statutory retirement age and has completed a contributory and non-contributory period of at least 22 years (in 2016–2017) and 25 years as a target.

Source: Own calculations on the base of data from Eurostat, Pension Fund of Ukraine online database, State Statistics Committee of Ukraine online database, Statistics Poland online database and Social Insurance Institution of Poland online database.

- 12.2% to the Zakład Ubezpieczeń Społecznych – ZUS (the Social Insurance Institution) account;
- 7.3% was transferred to an account in an open pension fund (OPF).

However since 1 May 2011 the breakdown of the pension contribution was changed several times. Until 30 June 2014, the division of pension insurance contributions and the transfer of part of it to an open pension fund was mandatory for persons born after 21 December 1968. These people had to enter into an agreement with an open pension fund. If the person did not have such an agreement, then in this case the Social Insurance Institution (ZUS) established a casual open pension fund for the insured person. Starting from July 2014, depending on the choice of the insured person, part of the pension insurance (namely the remaining 2.92%) was either paid into an open-ended pension fund chosen by the insured, or a sub-ZUS (total 7.3%). If the insured person does not enter an open pension fund, the entire pension insurance contribution (19.52%) is transferred to the Social Insurance Fund and is on the individual account of the insured [Ostarbeiter.vn.ua 2017, Parlińska 2017].

In Poland, the current pension legislation envisages adjusting the retirement age according to the previous stage of the pension reform. New retirement rules came into force in Poland on 1 October 2017. Now women will be able to leave work at the age of 60 years, and men – 65 years. In the same way, the requirements of the 2012 pension reform were abolished, which meant that ultimately the retirement age for men and women would be 67 years. Women should reach this age mark in 2040, and men in 2020 [Social Insurance Institution of Poland 2017].

Regarding the retirement age in Ukraine, it is lower than in Poland. In 2018, men can retire at the age of 60, and women at 58.5. The insurance experience, as shown in Table 1, is the same in both countries.

Studies show that currently the average pension in the solidarity system in Poland is equal to PLN 2,127 and is 23.4% of the average wage in the country. The minimum pension in 2017 was PLN 1,000 (Table 2). Comparing the levels of minimum and average pensions in Ukraine during this period, they are five times lower than in Poland. The replacement rate in Ukraine is also lower than in Poland. But it should be noted that the average size of pensions in Western European countries is several times higher than the figures of the Polish pension system. This suggests that incomes of retired citizens of Eastern European countries have not yet reached the level of developed Western European countries.

Table 2. Analysis of the state of the national pension systems of Ukraine and Poland in 2017

Index	Ukraine	Poland
Population (in million)	42.3	38.6
Number of pensioners (in million)	11.9	7.0
Share of pensioners in population (%)	28.1	18.1
Minimum pension	UAH 1 452 (EUR 45.92)	from 1 March 2017 PLN 1 000 (EUR 232.18)
Average pension	UAH 2 480 (EUR 78.42)	PLN 2 127 (EUR 493.85)
Average salary	UAH 7 105 (EUR 224.68)	PLN 4 271 (EUR 991.64)
The ratio between minimum and average pensions (%)	58.5	47.0
The ratio between the minimum pension and the average wage (%)	2.4	23.4
Replacement rate (%)	34.9	36.1

Source: Own calculations on the base of data from Eurostat, Pension Fund of Ukraine online database, State Statistics Committee of Ukraine online database, Statistics Poland online database and Social Insurance Institution of Poland.

CONCLUSIONS

Summarizing the above, it should be noted that Ukraine and Poland are building multilevel pension systems that involve the use of redistributive and accumulative pension programs. The experience of Western European countries shows that it is the accumulation of financial resources from all levels of the pension system that will be able to support the income of retired people at a high level, in accordance with the international standards of the ILO.

Studies conducted show that the current incomes of Ukrainian and Polish pensioners do not fully satisfy them. This situation in the pension sector forces the governments of both countries to continue the next stages of pension reform. The level of pensions in Poland is much higher than in Ukraine, but it has not yet reached the level of Western European countries. It is necessary to continue to carry out a set of measures that respond to demographic challenges, seek solutions to the problem of filling pension funds, and improve national pension systems. Their successful implementation will contribute to raising the welfare of retirement age citizens in both countries.

REFERENCES

Convention C102 – Social Security (Minimum Standards) of 28 June 1952 (No 102). ILO, Geneva. Retrieved from https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312247

Convention on Organization for Economic Co-operation and Development of 14 December 1960. OECD, Paris. Retrieved from https://www.oecd.org/general/conventionontheorganisationforeconomicco-operationanddevelopment.htm

Goryuk, N. (2012). Pension reform in Ukraine: the movement towards a mandatory accumulation pension system. [In:] Financial Sector Development Project. USAID, 2–20. Retrieved from http://pension.kiev.ua/files_ua.pdf

Koval, O. P. (2013). On the Wave of World Trends. Bulletin of the Pension Fund of Ukraine, 9, 23–25.

Libanova, E. M. (2010). Pension reform in Ukraine: directions of realization. Institute of Demography and Social Studies named after MV Studs of the National Academy of Sciences of Ukraine, Kyiv.

McTaggart, G. (2001). Pension reform in post-socialist countries. Social Work and Social Policy, 11, 19–25.

Naumenkova, S. V. (2010). Nederzhavne pensiyne zabezpechennya [Non-state pension provision in Ukraine]. Znaniya, Kyiv.

Onyshko, S. V. (2012). Potential for the development of the pension system in Ukraine in the context of reducing public finance risks. Current Problems of the Economy, 3, 248–352.

Ostarbeiter.vn.ua (2017). Pensiya v Pol'shchi, podatky, pensiynyy vik, seredniy rozmir pensiyi [Pension in Poland, taxes, retirement age, average pension. Retrieved from http://ostarbeiter.vn.ua/emerytura.html

Parlińska, A. (2017). Zasady wymiaru składki na ubezpieczenie społeczne [Principles of the social insurance contribution' calculation]. [In:] M. Podstawka (ed.), Finanse: instytucje, instrumenty, podmioty, rynki, regulacje [Finances: institutions, instruments, entities, markets, regulations]. Wydawnictwo Naukowe PWN, Warszawa, 420–430.

Parlińska, A., Rudyk, V. (2019). Features of the functioning of national pension systems of Eastern Europe and Ukraine in the modern conditions. [In:] A. Auzina (ed.), New dimensions in the development of society: home economics: finance and taxes: bioeconomy: proceedings of the International Scientific Conference, 9–10.05.2019 Jelgava. Latvia University of Life Sciences and Technologies, Jelgava, 182–187.

Social Insurance Institution of Poland (2017). Social Security in Poland. Retrieved from http://www.zus.pl/documents/10182/167615/Social+Security+in+Poland/71ffe1b1-c142-48fa-a67b-0c7e1cec6eb6 [accessed 15.01.2019].

Tkachenko, L. (2008). Ways of Further Reforming the Pension System of Ukraine. Bulletin of the Pension Fund of Ukraine, 8–9, 24–26.

US Agency for International Development (2010). Pension system of Poland. International Pension Bulletin, 16, 5.

US Social Security Administration (2014). Social Security Programs Through the World (SSPTW). International Update Recent Developments in Foreign Public and Private Pensions – update for 01.01.2014. Retrieved from https://www.ssa.gov/policy/docs/progdesc/intl_update/2014-01/2014-01.pdf

Zakon Ukrayiny pro vnesennya zmin do deyakykh zakonodavchykh aktiv Ukrayiny shchodo pidvyshchennya pensiy. VVR 2017, No 40–41, s. 383 [Law of Ukraine on amendments to certain legislative acts of Ukraine regarding the increase of pensions. The Official Bulletin of the Verkhovna Rada of Ukraine 2017, No 40–41, p. 383]. Retrieved from https://zakon.rada.gov.ua/laws/show/2148-19

Zakon Ukrayiny pro zahal'noobov'yazkove derzhavne pensiyne strakhuvannya. VVR 2003, No 49–51, s. 376 [Law of Ukraine on mandatory state pension insurance. The Official Bulletin of the Verkhovna Rada of Ukraine 2003, No 49-–51, p. 376. Retrieved from https://zakon.rada.gov.ua/laws/show/1058-15

ROZWÓJ PAŃSTWOWYCH SYSTEMÓW EMERYTALNYCH NA UKRAINIE I W POLSCE

STRESZCZENIE

Kryzys demograficzny oraz zwiększone obciążenie finansowe dla pełnosprawnych mieszkańców i pracodawców w zakresie finansowania wieku emerytalnego to doświadczenia Polski i Ukrainy. W związku z tym istniała potrzeba zreformowania państwowych systemów emerytalnych zgodnie z wymaganiami nowoczesnego społeczeństwa i potrzebą ochrony socjalnej obywateli w wieku emerytalnym. Autorzy artykułu przedstawili wyniki porównania charakterystycznych cech tworzenia i rozwoju państwowych systemów emerytalnych Ukrainy i Polski. Omówiono również możliwości korzystania z doświadczeń obu krajów w dalszej realizacji reformy systemu emerytalnego.

Słowa kluczowe: państwowy system emerytalny, reforma emerytalna, sfera demograficzna, starzenie się społeczeństwa, wiek emerytalny, emerytura

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EXPENDITURE ON CATERING SERVICES ACROSS EUROPEAN HOUSEHOLDS' BUDGETS

Marlena Piekut[1] ✉, Marina Valentukevičienė[2]

[1] Warsaw University of Technology
[2] Vilnius Gedyminas Technical University

ABSTRACT

The aim of the paper is to recognize and estimate alterations in expenditures on catering services across European households, with particular emphasis on households in Poland. The research material was obtained from the Statistics of Poland (GUS) and Eurostat. The research covers 2012 and 2016. It showed the increase of the share of expenditure on catering in total expenditure. It also showed statistically significant differences in the share for expenditure on catering in total expenditure between EU countries and types of Polish households by their demographic and social characteristics.

Key words: determinants of consumption, services, households, catering
JEL codes: D12, E21, O14, P46, R20

INTRODUCTION

Households with relatively large discretionary income make use of services [Zalega 2008], including catering services, with increasing frequency and range. The catering services satisfy consumer needs connected not only with food requirements but also with filling leisure time. Making use of them provides also other benefits, among them enrichment of consumption value, more efficient performance of household and better access to civilization achievements (e.g. ordering meals on-line). Moreover, this kind of services improves both personality development and forms of spending leisure time [Dąbrowska and Janoś-Kresło 2007]. European society welfare is increasing year on year, so more and more money is spent on eating out. Spending money on catering services is also the consequence of life style and household structure. It has become fashionable to celebrate family occasional events in a restaurant or to participate in tourist trips, which is coherent to eating out [Gutkowska and Piekut 2016]. People purchase and consume more food outside, rather than at home, due to the changing compositions of households (more elderly people, more singles) and their increasingly busy lives [Ingenbleek and Zhao 2018]. However, there are significant disparities in expenditures on catering services between households in different countries as well as between different types of households in the same country. The reasons for this state may be found in particular socio-demographic, location-based and financial situation of households as well as in diverse hierarchy of values and, consequently, hierarchy of needs. By further analyzing we can decide about future needs in catering services. According to Neto et al. [2016], the food and catering service sector involved more than 1.5 million enterprises, had a total turnover of approximately EUR

Marlena Piekut https://orcid.org/0000-0001-6449-5143; Marina Valentukevičienė https://orcid.org/0000-0001-8097-2982
✉marlena.piekut@pw.edu.pl

354 billion, and employed 8 million people around the Europe.

In the paper, the attention has been focused on the share of catering services in total expenditures across European countries. Moreover, an attempt was made to estimate character of expenditures on catering services and the factors (determinants) deciding on eating out in Polish households.

Thus, the aim of the paper is recognition and estimation of alterations in expenditures on catering services across European households, with particular emphasis to households in Poland. Poland joined the EU in 2004 together with many other countries of Central and Eastern Europe. In the newly-born EU-countries, macroeconomic and microeconomic indicators are slightly different from the countries of Western Europe. Central and Eastern European markets include relatively poorer consumers, but these are prospective markets. Consumers from Central and Eastern European countries follow to consumers from Western Europe. It is pointed out [Mazurek-Łopacińska and Sobocińska 2015] that in Poland, there are changes in consumption, which are expressed by reducing the distances between Polish consumers and consumers from highly developed economies of the EU countries. It can be assumed that in other countries from Central and Eastern Europe these distances are reduced.

The emerging middle class in the Central and Eastern European countries of consumers plays a large role. This class is an important economic and social actor because of its role as an engine of growth and an agent of social-economic development [Chun et al. 2017]. Central and Eastern European consumers are repeatedly the chief target of consumer-focused businesses because of their large size and discretionary spending power. In order to reach consumers, however, companies need a understanding levels of their income and expenditure, and also their spending priorities, values and attitudes [Euromonitor International 2015]. Consumers from Central and Eastern Europe can be extremely diverse.

Catering services meet the necessities of consumers and improve quality of their lives. Nowadays, servicization of consumption determines the standard, level and modernity of life style [Radziukiewicz 2012], so the defined scope of analysis seems to be relevant and important.

LITERATURE REVIEW

A consumer's behavior is influenced by many factors. The trends in consumption play a significant role in consumers behavior. The macrotrends that shape the purchasing behavior of households include, among others: asymmetry of income distribution both between groups of countries and within individual countries; changes in consumer value systems; servicization of consumption; changes caused by the development of new, non-standard forms of employment; increasing consumer mobility; growing interest in products that facilitate everyday life; increasing the scope and frequency of using the Internet; searching for sensations in consumption; individualizing the offer and co-participating in its creation [Mazurek-Łopacińska 2007, Mruk 2007, Zalega 2012]. Next to macrotrends, there are many micro- and macroeconomic determinants that influence consumer behavior. These factors have distinct characteristics that can be divided to social-economic, personal, cultural and psychological categories.

In microeconomic terms, economic-social factors affect consumer behavior significantly. Every consumer has someone around influencing their buying decisions. The important social determinants are reference groups and status. The group to which a consumer belongs influences the self-image of consumers and consumers' behavior. The groups to which a consumer does not belong yet can also influence. These aspiration groups are groups where a consumer aspires to belong and wants to be part in the future [Khan 2006, Kotler and Armstrong 2010]. Social-economic status reflects the position that individuals have in social groups based on such things as money and wealth, education and occupation. In many societies status is important and people want the admiration of others. Product, brand selection, services use often reflects the social role and status [Wright 2006].

Consumer's decisions are influenced by demographic factors such as an age, sex, life cycle stage,

marital status. The age of consumers change purchasing behavior. Traditionally a family life cycle included only young singles and married couples with children, but nowadays are alternative, nontraditional households such as single parents, childless couples, unmarried couples with children, same sex couples, and singles marrying later in life [Kotler and Armstrong 2010]. The place of residence of consumers is also very important. People from cities have easier access to infrastructure.

Consumers are increasingly using services. Services are an increasingly important point in total household expenditures. There are significant disparities in access to the market of catering services not only between different countries but also between different types of households in the same country. Catering services belong to higher-level needs, therefore they are more expected in households with better financial situation, although it is indicated that they depend on several variables describing households [Díaz-Méndez and García-Espejo 2012, Liu et al. 2013, Piekut and Gutkowska 2013]. Household expenditures on catering services are formed by many different macroeconomic, political and social determinants, including the following: GDP value in the country, unemployment level, general situation on labor market, alterations in household structure, activity of some social groups on labor market, ageing society, political changes, accessibility of services, price level, etc.; determinants indirectly affecting decision of household members, as well as micro-economical ones (direct). The complex interaction between consumers' everyday doings and contextual material and social processes, and also an abstraction consisting of a constellation of conceptual elements were analyzed by coauthors from Finland [Syrjälä et al. 2017].

Especially worthy of note are micro-economical determinants such as: household incomes (e.g. salary, loans, savings, affluence level), household members' position on labor market (e.g. professionally-active, unemployed, student, etc.) socio-demographic factors (e.g. size or biological type of household, place of dwelling, household members' age and education level, etc.), and also cultural ones (preferences, norms, values, attitude to tradition, etc.).

METHODS OF CATEGORIZATION OF EU HOUSEHOLDS BY TYPE OF EXPENDITURES ON CATERING SERVICES

The research material comes from Eurostat database and Statistics Poland (GUS) household budget survey of 2012 and 2016 [GUS 2012–2016]. The Polish databases are comprised of above 37 thousand households. The choice of the research period was dictated by the willingness to observe changes in spending on services after the financial and economic crisis.

To create groups and to illustrate the similarities and differences in the share of catering expenditure in the EU countries, it used Ward's method. In Ward's method deploys the analysis of variance approach to determine the distances between groups (clusters). This method minimizes the increase of the total within-cluster sums of squares, which is also known as the error sums of squares (ESS), measures the extent to which the analyzed variables in a given group differs from groups mean. At the beginning of the procedure, it is assumed that each object is a separate cluster. Then the pair of most similar groups (with minimum between-cluster distance) are merged. At the initial step, all groups are singletons (clusters containing a single point). The sum of squares starts out at 0 (because every point is in its own group) and then grows as we merge groups. Ward's method keeps this growth as small as possible. The sum of squares should be small [Murtagh and Legendre 2014]. The square Euclidean distance was used with this clustering method. This method is considered effective because it ensures the heterogeneity between groups, while the homogeneity of objects within the group [Ward 1963]. Then, in the dendrogram of the clustering result, the longer branches of groups (where the distances between groups are bigger) are cut off to obtain the optimal number of groups.

The analysis of variance was used for testing the significance of differences between arithmetic means of many groups. However, Scheffé's test was used to explore the significance of differences between pairs of variables. This is one of the tests for examining statistical significance, that allows to carry out post-hoc comparisons. This is the most conservative test.

Therefore its application results in the least number of significant differences between the means [Scheffé 1953].

The relationships between variables were identified using Pearson's correlation coefficient. It is a measure of the linear correlation (dependence) between two variables giving a value between +1 and −1 inclusive. The Pearson's correlation is +1 in the case of a perfect direct (increasing) linear relationship (correlation), –1 in the case of a perfect decreasing (inverse) linear relationship (anticorrelation) and 0 in the case of no linear relationship. The value of Pearson's correlation coefficient indicates the degree of linear dependence between the variables. The weaker the relationship between the variables, the closer the coefficient is to 0.

RESULTS OF EXPENDITURES ON CATERING SERVICES IN TERMS OF SHARE AND THE LEVEL

In Europe, five groups (clusters) of countries may be distinguished with respect to the level and shares (percentage) of money allocated on catering services in total annual expenditures in 2012 and 2016. Expenditures on catering services in terms of share (percentage) and the level (sum of money) got the lowest values in Romania, Bulgaria, Lithuania and Poland. These countries were categorized as the first group. The share of expenditures on catering services in 2016 was there in the range from 2.0% of total expenditures in Romania, through 2.5% in Poland and 2.7% in Lithuania to 4.3% in Bulgaria, with annual expenditure level EUR 100–200 per capita. Similarly, these countries without Bulgaria formed one group in 2012. At the time, Bulgaria belonged to the second group. The proportion of income spent on food and non-alcoholic beverages, which is the measure of household welfare (Engel's law) in 2016 was 27.9% in Romania, and over 22.2% in Lithuania. This share was the highest of all countries.

For the second group, covering seven European societies, the percentage of catering services in total expenses was from 4.4% in Germany, through 5.3% in Slovakia and 6.1% in Estonia to 7.7% in Hungary. The level of catering service expenses in this group was from EUR 400 in Latvia and Slovakia to EUR 800 in Germany. In 2012, the second group also consisted of seven countries, but with Bulgaria and without Germany.

The third group consists of Northern and Western European countries, i.e.: Belgium, France, Portugal, Sweden, Denmark, the Netherlands, Finland, Italy, Cyprus, Norway, the United Kingdom and Luxembourg. The percentage of catering expenditures in this group was running in the range from 5.2% in Denmark to 8.6% in Portugal and 8.7% in Cyprus, while the level of catering service was EUR 100–1,900 per capita. The percentage was comparable with preceding group, although the level of these expenses was higher. In 2012, the third group included Germany, Belgium, France, Denmark, the Netherlands, Sweden, Finland and Iceland. While countries such as Portugal, Italy, Cyprus, the United Kingdom, Norway and Luxembourg formed a separate group.

The fourth group households, i.e. households in Greece, Malta, Spain and Ireland, spent relatively high sums of money on catering services among all groups. In this group, the percentage of catering services was in the range from 11.5 to 14.8%, and the level of catering service expenses was within the scope of EUR 1,400–2,400 per capita. In 2012, the fourth group included Austria.

Finally, with respect to fifth group of households – in Austria and Iceland – the percentage of catering services expenses was respectively 10.3 and 9.5%, and these expenditures level was EUR 2,200 and EUR 2,800. In Iceland spent the most considerable sums of money on catering services of all countries.

The grouping presented above indicates that the level and share of catering services expenditures is affected by several factors, among them geographical or cultural ones.

Poor household financial situation in Romania, Lithuania and Poland results in low share of expenditures on services in total expenditures. The high level of money spent on mentioned basic necessities decides on relatively low discretionary budget, i.e. income, associated with spending on services. On the other hand, consumers from these countries seem to be a perspective group. The improving financial situation of households in these countries should lead to an increase in consumer spending on services.

Relatively not large values observed in these countries in comparison to Northern and Western European countries are probably caused by relatively worse household economic situation.

Meanwhile, intensive development of catering service market in Central and Eastern European countries has been observed for many years. It commenced from transformation of centrally-planned economies into market economies, when privatization process of economic operators started. For example, the increase of catering services in Poland began in 1988, together with the implementation the Act of 23 December 1988 on economic activity. Moreover, in Central and Eastern European countries have been observed larger annual growth rates than in Western European countries [Piekut 2015], which may indicate progressing process of harmonizing the structure of consumption expenses across Europe. In research by Díaz-Méndez and García-Espejo [2012] harmonizing of expenditures on eating-out through the European countries was pointed, however there was also noted that populations in individual countries still diverge significantly on this account. The differences are determined by economic, social, cultural and other factors. In is assumed that the willingness of poorer Central and Eastern European societies to match the higher level of Western countries may be the reason for the similarity of expenditures levels in the second and third clusters.

The differences are the result of different prices for catering services in these two groups. Both prices and incomes in Bulgaria and Romania are lower than in Denmark and Sweden.

IMPACT OF MICROECONOMIC FACTORS ON CATERING SERVICES EXPENSES ON THE EXAMPLE OF POLAND

The development of catering service sector, affluence, alterations in demographic structure (family composition and size) and changes in consumers' behavior result in systematical growth of the interest in catering services. In Poland, for example, approximately 15% people eat out regularly, 35% relatively often and 32% less often than quarterly [Makro 2015]. Eating out has, first of all, social context (the main reason for it is the willingness to meet friends) and only later – convenience and saving time. According to *Catering services in Poland – Report 2014*, Polish consumers prefer restaurants, pizzerias, fast-food restaurants and bars with ethnic cuisine; with male customers use more frequently fast-food outlets [BROG B2B 2014].

The research on Polish households demonstrate that catering service expenditures are affected mostly by the following variables: disposable income per capita, household biological type, household size, life-cycle stage, class of dwelling place, profession and education level of household head. The correlation coefficient between catering service expenditures level and independent variables, listed above, ranged in the scope from 0.203 to 0.653. Lower values of correlation coefficients were observed between catering service expenditures level and socio-economic group, age, marital status of household head and also degree of dwelling place urbanization. As for these variables, the values of correlation coefficients altered between 0.150 and 0.195; and every relation was statistically significant. The lowest values of correlation coefficients, indicating weak but statistically significant correlation, were denoted between the level of catering service expenditures and both region of dwelling place and sex of household head.

In order to demonstrate differences and alterations in both level and percentage of catering services' expenditures between the individual types of Polish households, for further analyses the following categorizing variables were selected: education level of household head, household biological type and the degree of dwelling place urbanization.

The education level of household head is the variable, which is relatively strongly correlating with the disposable income level per capita (correlation coefficient equal 0.350). The higher education level of household head is usually associated with the higher disposable incomes. Between all the types of households, distinguished due to the education level of household head and catering service expenditures (Scheffé's test), statistically significant differences ($p < 0.05$) have been found.

The catering service expenditures were the smallest for households with the head having at most lower secondary education, but in the period of four years

(2012–2016) these expenditures increased by 1.3 p.p., i.e. from 1.7 (PLN 13) to 3.0% (PLN 26) of total annual expenditures. For the households with the head having higher education, these expenditures were the highest of all being compared, and, in abovementioned period, their percentage increased from 3.5 (PLN 55) to 4.9% (PLN 78) of total expenditures. However, it has also been observed that the catering service expenditures in the latter mentioned group were 4.2-fold higher than in the first one in 2012 and only 3.0-fold in 2016. It means that the distance between households with the head with highest education level and households with the head with lowest education level is diminishing.

The association of larger catering service expenditures with the higher level of education was also observed in other research [Angulo et al. 2007, Zan and Fan 2010], which is explained not only with above-average incomes in the households of better-educated people but also with the fact that better educated people more often participate in social events. Relatively high disparities between disposable incomes in households whose heads has different level of education, affect accessibility to these services. Additionally, it has been denoted that the disparities in disposable incomes between households whose members have the lowest and the highest level of education are reduced. This phenomenon may be caused by sociological imitation effect and by aspiration for getting higher position in social hierarchy by worse-educated people [Carvalho de Rezende and Stacanelli de Avelar 2012]. However, it has also been observed that educational level variable does not work in the same way in all the countries [Díaz-Méndez and García-Espejo 2012]. For example, comparison of expenditures on catering services in Spanish and British households showed that education level stronger acts on mentioned expenditures in Spanish households.

The biological type of household has been recognized as another statistically significant factor connected with expenditures on catering services. The highest level of expenditures on catering services was denoted in one-person households. The share of mentioned expenditures in total expenditures for this type of households increased by 2.2 p.p. (from 3.7 to 5.9% total expenditures) in the period of four years (2012–2016). A little lower expenditures, but still relatively high, were observed in single-parent households (i.e. single father of mother). In such single-parent families, expenditures on catering services absorbed larger part of household budgets than in single-person households. For example, in 2016, for single mothers the value was 5.8% (PLN 65) while for single fathers 7.0% (PLN 92). The least percentage of expenditures on catering services was noticed for households of other persons (not classified in other groups) with dependent children, though for these families the percentage of the abovementioned expenditures increased between 2012 and 2016 by 1.5 p.p. (from 1.3 to 3.0% of total expenditures).

It has been also indicated [Bozoğlu et al. 2013] that households with dependent children allocate more money for eating out than childless families, which is partially confirmed also in this analysis. The larger expenditures on catering services in households with dependent children may be the consequence of the fact that children often make use of fast-food services, which is confirmed by several researchers, among them Akbay et al. [2007] and Bozoğlu et al. [2013]. On the other hand, in numerous studies [Jensen and Yen 1996, Mihalopoulos and Demoussis 2001, Chang and Yen 2010, Carvalho de Rezende and Stacanelli de Avelar 2012] it was demonstrated that having dependent children negatively affects expenditure on catering services, which indicates simultaneous impact of other variables. It was also pointed [Piekut 2017], that in single-male households, especially by blue-collar workers expenditures on catering services are relatively high. This may be connected with reluctance and lack of cooking abilities in men households.

The last variable indicating differences in expenditure on catering services, expressed both as level and percentage, is the degree of urbanization in the place where a household is located. It has been observed that the less densely populated was the place of household location, the less its dwellers spent on catering services. For densely populated areas expenditures on catering services were from 2.8-fold (in 2012) to 2.4-fold (in 2016) larger in comparison to thinly-populated areas. In 2016 these expenditures on densely populated areas absorbed 4.8% (PLN 65), whereas on thinly-populated areas only 2.9% (PLN 27).

Other studies [Piekut and Gutkowska 2013] demonstrate that in the larger settlement unit (in terms of population), the expenditures on catering services were higher and they absorbed larger part of household budget. Lower expenditures on eating out were observed for rural household, especially connected with farms [Ogundari et al. 2015]. For this type of households, making use of tourism is not popular (for many reasons, mainly financial ones), whereas making use of catering services is connected with tourist trips. Other reasons for less expenditure on catering services in rural household are attributable by Piekut and Gutkowska [2013] to the lack of free time and hierarchy of value in this type of household.

CONCLUSIONS

In respect of expenditure on catering services, five groups of countries may be distinguished among all EU countries. Generally, lower expenditures on catering services in Central and Eastern European countries (in relation to total expenditure) than in Northern and Western European countries have been observed. It seems that the disposable income levels in households from individual European countries play a special role.

The expenditures on catering services depend on several variables, including strong association with education level of household head. The level of education is obviously connected with character of occupation and specific nature of profession, which determine the way of organizing of eating at home or eating out. Higher expenditures on catering services observed in households of people with higher level of education are caused by larger incomes and more frequent participation in social events.

Higher expenditures on catering services were also denoted both among single-person households, single-parent households (i.e. single father or mother) and couples with dependent children.

The significant variable in estimation of expenditures on catering services was household location. The mentioned expenditures were higher in densely populated locations than in rural territories. This is associated to better infrastructure of catering units in large cities and statistically higher incomes obtained by dwellers of cities.

To sum up, significant distinction in expenditures on catering services between households having different socio-demographic and economic features as well as their share in total expenditures has been proven. It can be assumed that these differences are significant for alternative lifestyles in those households and hierarchy of values considered by them.

REFERENCES

Akbay, C., Tiryaki, G. Y., Gül, A. (2007). Consumer characteristics influencing fast food consumption in Turkey. Food Control, 18 (8), 904–913.

Angulo, A. M., Gil, J. M., Mur, J. (2007). Spanish demand for food away from home: analysis of panel data. Journal of Agricultural Economics, 58 (2), 289–307.

Bozoğlu, M., Bilgic, A., Yen, S. T., Huang, C. L. (2013). Household food expenditure at home and away from home in Turkey. Agricultural and Applied Economics Association (AAEA) and CAES joint Annual meeting, Washington DC [manuscript of presentation].

BROG B2B (2014). Rynek gastronomiczny w Polsce – Raport 2014 [Catering services in Poland – 2014 Report]. Warszawa.

Carvalho de Rezende, D., Stacanelli de Avelar, A. E. (2012). Factors that influence the consumption of food outside the home in Brazil. International Journal of Consumer Studies, 36 (3). DOI: 10.1111/j.1470-6431.2011.01032.x

Chang, H. H., Yen, S. T. (2010). Off-farm employment and food expenditures at home and away from home. European Review of Agricultural Economics, 37 (4), 523–551.

Chun, N., Hasan, R., Rahman, M. H., Ulubaşoğlu, M. A. (2017). The Role of Middle Class in Economic Development: What Do Cross Country Data Show? Review of Development Economics, 21 (2), 404–424. DOI: 10.1111/rode.12265

Dąbrowska, A., Janoś-Kresło, M. (2007). Konsumpcja w krajach Europy Środkowo-Wschodniej [Consumption in the countries of Central and Eastern Europe]. PWE, Warszawa.

Díaz-Méndez, C., García-Espejo, I. (2012). Tendencias en la homogeneización del gasto alimentario en España y Reino Unido [Contemporary Food Trends in the Homogenization of Food Expenditure in Spain and UK]. Revista Espanola De Investigaciones Sociologicas, 139, 21–44. DOI: 10.2307/41762452

Euromonitor International (2015). Middle Class Consumers: values and Priorities. Market Research Report.

Eurostat. Final consumption expenditure of households by consumption purpose (COICOP 3 digit) [nama_10_co3_p3]. Retrieved from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_co3_p3&lang=en [accessed: 20.12.2018].

Główny Urząd Statystyczny (2012–2016). Budżety gospodarstw domowych. Dane za lata 2012–2016 [Household budget survey. Data of 2012–2016]. Warszawa.

Gutkowska, K., Piekut, M. (2016). Korzystanie z usług gastronomicznych przez Polaków [The Use of Catering Services by Poles]. Zeszyty Naukowe SGGW w Warszawie. Polityki Europejskie, Finanse i Marketing, 16 (65), 15–24.

Ingenbleek, P. T., Zhao, Y. (2018). Hutten catering: how to organize innovation for vital consumers in a sustainable food system? International Food and Agribusiness Management Review, 21 (5), 583–594. DOI: 10.22434/IFAMR2018.0021

Jensen, H. H., Yen, S. T. (1996). Food expenditures away from home by type of meal. Canadian Journal of Agricultural Economics, 44 (1), 67–80. DOI: 10.1111/j.1744-7976.1996.tb00143.x

Khan, M. A. (2007). Consumer behaviour and advertising management. New Age International, New Delhi.

Kotler, P., Armstrong, G. (2010). Principles of marketing. Pearson Education, London.

Liu, M., Kasteridis, P., Yen, S. T. (2013). Breakfast, lunch, and dinner expenditures away from home in the United States. Food Policy, 38 (C), 156–164. DOI: 10.1016/j.foodpol.2012.11.010

Makro (2015). Polska na talerzu 2015. Raport firmy MAKRO Cash & Carry [Poland on the plate 2015. MAKRO Cash & Carry reports]. Retrieved from http://www.grupaiqs.pl/wp-content/uploads/2015/04/raport_polska_na_talerzu_2015.pdf [accessed: 25.02.2019].

Mazurek-Łopacińska, K. (2007). Zachowania polskich konsumentów wobec nowych trendów w otoczeniu [Behavior of Polish consumers towards new trends in the environment]. [In:] Z. Kędzior (ed.), Konsument – Gospodarstwo domowe – Rynek [Consumer – Household – Market]. Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice.

Mazurek-Łopacińska, K., Sobocińska, M. (2015). Dystanse cywilizacyjne w konsumpcji Polaków i ich uwarunkowania w kontekście trendów występujących w Unii Europejskiej [Civilization distances in the consumption of Poles and their conditions in the context of trends occurring in the European Union]. Handel Wewnętrzny, 4, 100–112.

Mihalopoulos, V. G., Demoussis, M. P. (2001). Greek household consumption of food away from home: a microeconometric approach. European Review of Agricultural Economics, 28 (4), 421–432. DOI: 10.1093/erae/28.4.421

Mruk, H. (2007). Makrotrendy a zachowania konsumentów [Macrotreas and consumer behavior]. [In:] Z. Kędzior (ed.), Konsument, gospodarstwo domowe, rynek [Consumer, household, market]. Akademia Ekonomiczna w Katowicach, Centrum Badań i Ekspertyz, Katowice.

Murtagh, F., Legendre, P. (2014). Ward's hierarchical agglomerative clustering method: which algorithms implement Ward's criterion? Journal of Classification, 31 (3), 274–295.

Neto, B., Rodríguez Quintero, R., Wolf, O., Sjögren, P., Lee, P. (2017). Revision of the EU Green Public Procurement criteria for food and catering services. EEB comments to the JRC's 3rd Technical Report.

Ogundari, K., Aladejimokun, A. O., Arifalo, S. F. (2015). Household demand for food away from home (FAFH) in Nigeria: the role of education. The Journal of Developing Areas, 49 (2), 247–262. DOI: 10.1353/jda.2015.0004

Piekut, M. (2015). Konsument i konsumpcja w Unii Europejskiej [Consumer and consumption in the European Union]. Oficyna Wydawnicza Politechniki Warszawskiej, Płock.

Piekut, M. (2017). Wzorce konsumpcji według typów wiejskich gospodarstw domowych w latach 2004–2014 [Consumption patterns by types of rural households in 2004–2014]. Difin, Warszawa.

Piekut, M., Gutkowska, K. (2013). Uwarunkowania poziomu wydatków na turystykę i rekreację oraz usługi gastronomiczne i zakwaterowania w wiejskich gospodarstwach domowych [Determinants of spending on tourism and recreation as well as catering services and accommodation in rural households]. Marketing i Rynek, 8, 527–539.

Radziukiewicz, M. (2012). Zmiany sytuacji dochodowej a wydatki na usługi w polskich gospodarstwach domowych [Changes in the income situation and expenses for services in Polish households]. Konsumpcja i Rozwój, 1 (2), 101–116.

Scheffé, H. (1953). A method for judging all contrasts in the analysis of variance. Biometrika, 40 (1–2), 87–110. DOI: 10.1093/biomet/40.1-2.87

Syrjälä, H., Luomala, H. T., Autio, M. (2017). Fluidity of places in everyday food consumption: Introducing

snackscapes. International Journal of Consumer Studies, 41 (6). DOI: 10.1111/ijcs.12389

Ustawa z dnia 23 grudnia 1988 r. o działalności gospodarczej. Dz.U. 1988 nr 41, poz. 324 [Act of 23 December 1988 on economic activity. Journal of Laws 1988 No 41, item 324].

Ward Jr, J. H. (1963). Hierarchical grouping to optimize an objective function. Journal of the American statistical association, 58 (301), 236–244. DOI: 10.1080/01621459.1963.10500845

Wright, R. (2006). Consumer behaviour. Cengage learning EMEA.

Zalega, T. (2008). Konsumpcja w gospodarstwach domowych o niepewnych dochodach [Consumption in households with uncertain income]. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa.

Zalega, T. (2012). Konsumpcja. Determinanty, teorie, modele [Consumption. Determinants, theories, models]. PWE, Warszawa.

Zan, H., Fan, J. (2010). Cohort effects of household expenditures on food away from home. The Journal of Consumer Affairs, 44 (1), 213–233. DOI: 10.1111/j.1745-6606.2010.01163.x

WYDATKI NA USŁUGI GASTRONOMICZNE W BUDŻETACH EUROPEJCZYKÓW

STRESZCZENIE

Celem badania była identyfikacja zmian w wydatkach na usługi gastronomiczne w gospodarstwach domowych z Unii Europejskiej, ze szczególnym uwzględnieniem gospodarstw domowych w Polsce. Materiał źródłowy pochodził z GUS oraz Eurostat. Okres badawczy obejmował lata 2012 i 2016. Zauważono wzrost udziału wydatków na usługi gastronomiczne w wydatkach ogółem. Wykazano istotne statystycznie różnice w udziale na wydatki na gastronomię w wydatkach ogółem między krajami UE i typami polskich gospodarstw domowych według cech demograficzno-społecznych.

Słowa kluczowe: determinant konsumpcji, usługi, gospodarstwo domowe, gastronomia

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THE LEVEL OF INCOME INEQUALITIES AND REDISTRIBUTION POLICIES IN EUROPEAN UNION COUNTRIES

Małgorzata Raczkowska[1] ✉, Joanna Wrzesińska-Kowal[2] ✉

Warsaw University of Life Sciences – SGGW

ABSTRACT

The article addresses issues concerning the level of income inequalities in the countries of the European Union in 2010 and 2018. Subject literature and secondary Eurostat data were used in order to achieve the aim of the study. The obtained results confirmed the presence of a large variability in the level of income inequalities between countries of the European Union. Bulgaria and Lithuania were the countries characterized by the biggest income inequalities. The smallest income disproportions, independent of the interference of the state, occurred in the Czech Republic, Slovakia and Slovenia. In addition, in 2018, a relatively large drop in inequality in Poland, as well as an increase in inequality in Luxembourg, Sweden and the Netherlands was observed. The study conducted allows to confirm the hypothesis assumed at the beginning, which states that in countries that are part of the European Community, the governments effectively contribute to the reduction in income inequalities by means of taxes and social remittances. However, a decrease in so-called the Gini gap in most European Union countries means that the effectiveness of redistribution has been decreasing.

Key words: redistribution, income, income inequalities, social remittances
JEL codes: D3, D63, O52

INTRODUCTION

The occurrence of inequalities is natural and inevitable in any economy based on the free market system. This phenomenon causes a given individual or a social group to be superior to others in many dimension and aspects of life. Such an advantage is usually expressed by means of differences in wages, access to various goods, education, information or even when people do not have equal rights. The problem is not the fact of inequalities existing in and of itself but rather their scale and the fact that they are growing more severe, as this may pose a threat to the stability of economic growth and social cohesion. In addition, inequalities may lead to intolerance, discrimination – more broadly to political instability: in the social and economic spheres, and they have a negative impact on the legal system and the area of regulations [Szczepaniak 2018].

As such, it is of vital importance that the level of inequalities, in particular, the financial ones, be constantly monitored both by public and social institutions. In the countries of the European Union, income inequalities are the subject of numerous studies and analyses, and the redistribution policy pursued by individual European states is an important element in reducing the level of income inequalities.

The main aim of the study was to identify and evaluate changes in the level of income inequalities in European Union countries, as well as to determine

Małgorzata Raczkowska https://orcid.org/0000-0002-8540-8958; Joanna Wrzesińska-Kowal https://orcid.org/0000-0001-5492-8187
✉malgorzata_raczkowska@sggw.pl; joanna_wrzesińska@sggw.pl

to what extent taxes and social remittances contribute to reducing inequalities in the distribution of income. In order to achieve the aim, the following research hypothesis was adopted: in European Union countries (EU-28), the state, by means of taxes and social remittances, effectively contributes to a reduction in the income inequalities measured by the value of the Gini coefficient.

MATERIAL AND METHODS

The main research methods applied in the work include a critical and comparative analysis of the relevant literature, an analysis of numerical data, as well as simple statistical methods such as the Pearson correlation. Secondary data from the EU-SILC Eurostat study served as the basic source of information. The years 2010–2018 were adopted as the scope of the comparative analysis.

In order to achieve the aim, it was assumed that income inequalities are defined as the lack of equality between the analysed entities in the level of their income. The Gini coefficient was used in order to evaluate the degree of income inequalities, both in the spatial and temporal dimension – in a form which accounts for periods both prior to, as well as after considering taxes and social transforms.

The Gini coefficient[1] is defined as half of the mean absolute value between two property values selected randomly from the population. Thus, the index shows what is the percentage of the average income that is the difference between two compared entities [Bartak 2018]. Assuming that income values are ordered in ascending manner, the Gini coefficient is determined using the formula:

$$G = \frac{\frac{1}{2n^2}\sum_{i=1}^{n}\sum_{j=1}^{n}\left|x_i - x_j\right|}{\overline{x}}$$

where:
G – the Gini coefficient;
x_i – value of the i variable for a household;
x_j – value of the j variable for a household;
$\overline{x}$ – average value of a property;
n – size of the sample;
i – observation position within a string (in ascending order).

Values of the Gini coefficient fall within the range of [0, 1], and values of the Gini index fall within the range of between 0 and 100. Zero means a completely even distribution, while 1 (or 100) signifies maximum inequality, which means that only one observation obtains a positive value of the variable – only one household has income, and the rest of the households have no income at all [Stawicka 2012].

The following were used in order to analyse the impact of taxes and social remittances on the level of income inequalities in European Union countries [Zwiech 2013]:
– the Gini coefficients' variability index (Z_{GC}), so-called the Gini gap, expressed using the formula:

$$Z_{GC} = GC_B - GC_A$$

– the Gini coefficients' correlation index (R_{GC}), expressed using the formula:

[1] It should be noted that the Gini coefficient is a measure not devoid of drawbacks. As Rafał Nagaj points out "this measure is insensitive to changes within particular income groups and does not take into consideration whether social welfare is improved or not as a result of specific actions of the state" [Nagaj 2013]. It only demonstrates the change in the uniformity of income distribution. Furthermore, Stanisław Maciej Kot and Katarzyna Ostasiewicz point out that the Gini coefficient should not be used to assess global income inequalities, because this measure is not decomposable. The problems are posed here by deficiencies in statistical databases, which are aimed at gathering information about incomes on a global scale. Only some summary statistics are usually presented, such as participation in the quintile, the middle value or the Gini coefficient [Kot and Ostasiewicz 2019]. Despite these reservations, the Gini coefficient calculated by Eurostat is a normalized quantity, which facilitates the process of making comparisons both over time and between countries. It was used in developing the assessment of the effectiveness of state instruments in eliminating income inequalities in the European Union.

$$R_{GC} = \frac{GC_B - GC_A}{GC_B} 100$$

where:

GC_B – the Gini coefficient before taking taxes and social remittances into account (based on the so-called market income);

GC_A – the Gini coefficient after taking taxes and social remittances into account (based on the disposable income).

The Gini coefficients' variability index shows by what value the analysed index was reduced as a result of taxation and social remittances. It takes values from the range of [0, 1]. If the effectiveness of the abovementioned measures of a state's redistribution policy on reducing income inequalities is minimal, then Z_{GC} is close to 0. However, if the inequalities are completely reduced, then the value of Z_{GC} equals 1.

The Gini coefficients' correlation index demonstrates the percentage difference between the Gini coefficient before and after taking taxes and social remittances into account. It takes values from 0 to 100%. In a situation where taxation and social remittances do not reduce income inequalities, R_{GC} is close to 0%, and when they reduce income inequalities completely, then R_{GC} amounts to 100%.

INCOME INEQUALITIES IN THE THEORY OF ECONOMICS – AN OVERVIEW OF SELECTED VIEWS

The approach of economics to inequality, defined as an economic category, has changed over the centuries. The interest in the division, diversification of income and the increasingly severe inequalities stemming from it has not always been part of the main trends in research. Often, it was a topic that only served as a complement of the conducted considerations and analyses.

Adam Smith, in spite of stating that "No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable", did not devote any comprehensive research to this issue [Smith 1954]. This is because he believed that the livelihood of an individual and their position in the society depend solely on him or her. Individuals whose efforts and personal contributions to the economy are significant and valuable should be wealthy. However, if an individual is poor, this is either because he or she wants to be poor, by deciding against working and by not saving the obtained income, or because their input of labour is not very productive, which is why he or she does not deserve to enjoy substantial prosperity. In addition, Smith believed that, by virtue of the so-called invisible hand of the market, an individual who cares for his own standard of living, simultaneously influences the entire society and its prosperity [Smith 2004]. This results from the fact that private stimuli present in the market economy lead to the effective allocation of resources and the maximization of social income [Litwiński 2017].

A somewhat bigger interest in the topic of income inequalities was generated thanks to the English economist David Ricardo. He pointed to the state's redistribution policy and the need to actively support people in their search for work. According to this economist, if a certain group of people will not work and will permanently live off state aid, then the weakening of general market stimuli and the deterioration of the living standard of the rest of the society may occur [Ricardo 1817].

On the other hand, John Stuart Mill, the last of the great classics, noted another important and significant aspect with regard to the role of the state in reducing inequalities. J.S. Mill wrote that "the laws of production are constant, but the division of personal income changes through social intervention" [Justyńska and Justyński 2004]. According to him, the laws governing production are based on objective natural laws and are beyond the control of a man. On the other hand, the laws of division are related to the system of social institutions and may be modified in accordance with the emerging social needs. J.S. Mill wanted to conduct a social reform aiming at improving the livelihood of the poorest people through changes in the institutional sphere, in order to implement the concept of an affluent society [Mill 2005].

The birth of another school of thought – neoclassical economics – did not cause a significant and noticeable progress in analysing the problem of income inequalities. The functional distribution of income was

regarded in a similar way, but this was achieved by replacing the macroeconomical analysis characteristic of the classics with microeconomics [Blaug 2000]. In his research, the leading representative Alfred Marshall [1890] attempted to explain the ways of reducing the variability of income. He noted that higher increments in economic rent are observed among people with lower incomes. Therefore, if there occurs a reduction in the variability of income, it is possible to increase the total economic rent for the entire society [Grzelak 2016]. However, he emphasized that the reduction of inequalities must not suppress the free initiative of the population and contribute to slowing down the growth of the national dividend [Litwiński 2017].

One economist whose research had a significant impact on increasing the interest in issues related to inequality was Simon Kuznets [1976]. The purpose of his considerations was to explain the long-term trends with regard to income inequality in the economy as a whole. While analysing the economic growth and economic inequalities of three developed countries (the United Kingdom, Germany and the USA) and three so-called Third World countries (India, Sri Lanka and Puerto Rico), he stated that inequality in the distribution of income takes on a different form at different stages of economic development [Jastrzębska and Lechwar 2012]. He illustrated this dependence using a curve in the shape of an inverted letter "U". Initially, the inequality is small, the economy develops, then in gradually starts to increase and stabilizes and, once a certain threshold of affluence is crossed, it begins to fall. At first, economic growth increases inequalities, whereas later on, it contributes to their decline.

Among the contemporary considerations regarding aspects of income inequalities, the original approach of the Indian economist Amartya Sen is worthy of note. His research on inequality consists of an interdisciplinary approach that combines knowledge from the fields of sociology, economics, psychology, and ethics. In contrast to S. Kuznets, he opposes treating economic growth as the main factor associated with the level of inequality and poverty [Jastrzębska and Lechwar 2012]. In his considerations, the Nobel Prize winner did not pay much attention to the division of goods, but focused his research on the equality of opportunities. He pointed to the fact that many negative social phenomena (poverty, hunger) result not from the lack of a sufficient number of goods and services on the market, but from their incorrect distribution [Sen 2000].

In the twenty-first century, Thomas Piketty, the author of *Capital in the Twenty-First Century*, was the most influential in the field of research and discussion on economic inequalities. The main research area of the French economist concerns the relationship between the rate of return on capital and the rate of economic growth. T. Piketty claims that capitalism automatically generates inequalities that are arbitrary and inconsistent with the idea of balanced development of inequalities because the rate of return on capital exceeds the rate at which production and income grow [Piketty 2015]. For this reason, the wealth of affluent people grows faster than income resulting from the labour of poorer people. As a consequence, the disproportions in wealth are increasing, in Europe, for instance, 10% of the richest people possess approx. 65% of all the wealth [Grzelak 2016].

RESULTS AND DISCUSSION

The comparison of the values of the Gini index, determined on the basis of disposable income for the years 2010–2018, shows a large variability among countries of the European Union in terms of income inequalities (Table 1). In 2010, the difference between particular member states amounted to over 13 percentage points, i.e. between 23.8% in Slovenia and 37% in Lithuania. This means that income inequalities in Lithuania were over 64% higher than in Slovenia. High income inequalities (index values of above 35%) were also recorded in Latvia and countries of Southern Europe – in Bulgaria and Romania, as well as in Spain, Greece and Portugal. Meanwhile, low values of the Gini index (below 26%) were observed in Sweden, Finland, the Netherlands, as well as the Czech Republic and Slovakia. In 2010, Poland was in the group of European Union countries with a higher than average level of income inequality.

When comparing 2018 to 2010, it may be noticed that the average level of income inequality in the European Union almost did not change – the average value of the Gini index increased by 0.2 percentage

point and was at the level of approx. 30%[2]. However, there were countries in which significant increases in inequality were observed, especially in Bulgaria – by 21.5%, Hungary – by over 16%, and in relatively rich European Union countries, such as Luxembourg – by 11%, Sweden – by nearly 10% and in the Netherlands – by approx. 6%. Meanwhile, the largest decrease in the value of the Gini coefficient was recorded in Slovakia (over 10%) and Poland (6%). It should be noted that the decreasing values of the Gini index are not tantamount to an improvement of the situation of people with the lowest income because changes which determine the value of this index may be related to different sections of income distribution.

Failing to take into account income redistribution leads to changes in income inequalities in European Union countries (Table 1). In the analysed years, income inequalities measured on the basis of the market revenues were at a much higher level – in 2010, between 29.8% in the Czech Republic and 46.8% in Ireland and in 2018, between 26.2% in Slovakia and 43.4% in Bulgaria. Apart from Lithuania, Latvia, Spain and Portugal, in the group of states with a high value of the index there were also three countries – Sweden, Denmark (countries with a social democratic, welfare system), as well as France. Meanwhile, the lowest income inequalities were a characteristic of not only the Czech Republic, Slovakia, Slovenia, Malta and the Netherlands, but also Poland – with the value of the Gini index amounting to approx. 34%. Moreover, Poland, prior to taxation and remittances, was in the group of countries with a value of the index lower than the median and the mean.

Even greater differences in the values of the Gini index before and after the redistribution of income are visible when social remittances do not include economic rents (Table 1). In most countries, the index then reaches a value of above 48%, which is the level typical of developing countries. Two countries – Sweden and Portugal, are particularly noteworthy because in the analysed years, the value of the Gini index, calculated on the basis of market revenue with the exclusion of economic rents, was almost twice as high as the one calculated on the basis of disposable income. In contrast, Poland is placed between the first and the second quartile in this ranking, thus, in most countries of the European Community, the values of this index were higher.

In all countries of the European Community, taxes and social remittances effectively nullified the variability in income distribution – all the values of the Gini coefficient based on measuring disposable income were lower than those related to market revenue (Table 2). Income stratification was reduced to the largest extent in Ireland (the decrease in the Gini coefficient in 2010 equalled as many as 16 percentage points), Denmark, Finland, Sweden and Hungary. Meanwhile, redistribution policies decreased inequalities to the smallest extent in Italy, Latvia and in Greece. The average in terms of differences in the value of the index for these countries equals just over 2 percentage points.

However, an analysis of the variability of the Gini coefficient in the years 2010-–2018 points to a reduction of the Gini gap. This means that the efficiency of redistribution in most European Union countries has been decreasing. The decline in this correlation took place in Austria, Belgium, Croatia, the Czech Republic, France, Spain and Germany. A systematic increase in the efficiency of redistribution occurred only in Finland and, to a small extent, in Greece.

Here, is worth noting that despite the noticeably significant impact of social aids on nullifying income inequalities in countries of the European Community, there is a risk that they will contribute to increasing the severity of the inequalities in a situation when they are directed at the whole society, and not only at the poorest. Furthermore, the social benefit system may reduce the professional activity of the population, since part of the society may prefer the help of the state in the form of aids and benefits rather than engaging in gainful employment.

In order to better illustrate the impact of taxation and social remittances on the level of income inequality, the Gini coefficients' correlation index was used. In the analysed years, in relative terms, income inequalities were reduced to the greatest extent through

[2] This value is the average of the Gini coefficients in particular European Union countries and not the Gini coefficient for the entire population of the European Community.

Table 1. The Gini coefficient (%) before and after taxation and social remittances in European Union countries in 2010 and 2018

Country	Excluding taxes and social remittances				Including taxes and social remittances	
	economic rents included	economic rents excluded	economic rents included	economic rents excluded		
	2010		2018		2010	2018
Austria	34.4	47.9	33.8	47.5	28.3	27.9
Belgium	34.8	46.5	33.6	48.5	26.6	26
Bulgaria	35.9	46.5	43.4	48.5	33.1	40.2
Croatia	37	48.2	34.1	47.8	31.6	29.9
Czech Republic	29.8	43.8	28.2	43.7	24.9	24.5
Cyprus	33.5	42.4	34.7	48.6	30.1	30.8
Denmark	38	51.3	36.7	49.9	26.9	27.6
Estonia	35.3	47.4	35.2	45.7	31.3	31.6
Finland	33.9	45.8	34.3	48.8	25.4	25.3
France	37.6	49.2	35.7	50.8	29.8	29.3
Germany	35.9	55.4	35	54.4	29.3	29.1
Greece	34.9	49.1	36	58.2	32.9	33.4
Hungary	32.9	49.3	36.4	50.7	24.1	28.1
Ireland	46.8	53.9	41.6	49.6	30.7	30.6
Italy	33.7	47.5	34.9	48.3	31.7	32.7
Latvia	39	50.9	37	47.2	35.9	34.5
Lithuania	42.4	55.1	41.3	52	37	37.6
Luxembourg	34.9	46.3	36.4	50.2	27.9	30.9
Malta	33	42.7	32	43.9	28.6	28.3
Netherlands	31.8	44.2	32.6	46.4	25.5	27.1
Poland	34.7	47.9	33.6	47.3	31.1	29.2
Portugal	38.3	50	36.9	58.2	33.7	33.5
Romania	37.4	53.2	36.5	51.6	33.5	33.1
Slovakia	30	43.3	26.2	39.3	25.9	23.2
Slovenia	29.8	42.1	29.3	43.1	23.8	23.7
Spain	37.7	46.8	38.1	49.7	33.5	34.1
Sweden	35.1	56	36.7	57.6	25.5	28
United Kingdom	35.1	53.6	36.7	54	32.9	33.1

Source: Original work based on Eurostat database.

Table 2. The Gini coefficients' variability and correlation indices in 2010 and 2018

Country	The Gini coefficients' variability index (Z_{GC})				Country	The Gini coefficients' correlation index (R_{GC})			
	pension included	pension excluded	pension included	pension excluded					
	2010		2018			2010		2018	
Austria	0.061	0.059	17.7	17.4	Lithuania	0.054	0.037	12.7	8.9
Belgium	0.082	0.076	23.5	22.6	Luxembourg	0.070	0.055	20	15.1
Bulgaria	0.028	0.032	7.7	7.3	Latvia	0.031	0.025	17.9	6.7
Croatia	0.054	0.042	18.6	12.3	Malta	0.044	0.037	13.3	11.5
Cyprus	0.034	0.039	10.1	11.2	Germany	0.066	0.059	18.3	16.8
Czech Republic	0.049	0.037	16.4	13.1	Poland	0.036	0.044	10.3	13
Denmark	0.111	0.091	27.1	24.7	Portugal	0.046	0.034	12	9.2
Estonia	0.040	0.036	11.3	10.2	Romania	0.039	0.034	10.4	9.3
Finland	0.085	0.090	25	26.2	Slovakia	0.041	0.030	13.6	11.4
France	0.078	0.064	20.7	17.9	Slovenia	0.060	0.056	20.1	19.1
Greece	0.020	0.026	5.7	7.2	Sweden	0.096	0.087	27.3	23.7
Spain	0.042	0.040	11.1	10.4	Hungary	0.088	0.083	26.7	22.8
Netherlands	0.063	0.055	19.8	16.8	United Kingdom	0.022	0.036	6.2	9.8
Ireland	0.161	0.110	34.4	26.4	Italy	0.020	0.022	5.9	6.3

Source: Original work based on Table 1.

taxation and remittances in Ireland (by nearly 35% in 2010), Finland (by 26% in 2018) and in Sweden (by 27% in 2010). In turn, taxes and remittances reduced inequalities to the smallest extent in Greece and Italy; they effected a reduction of approx. 6% in 2010. The effectiveness of the redistribution policy with regard to reducing income inequalities in Poland was clearly increased in 2018.

The correlations between the selected indicators and the level of income inequalities measured using the Gini coefficient, including taxes and social remittances, were examined by applying the Pearson correlation coefficient (Table 3). The data from Table 2 and a comparison of expenses for social purposes in particular countries of the European Community expressed in GDP were used.

Table 3. The correlation between the Gini coefficient and selected variables[a]

Specification	r (X, Y)	R^2
Share in GDP of public expenses for social purposes (%)	–0.457	0.208
The Gini gap	–0.471	0.220
Mean of the average equivalised net income	–0.556	0.309

[a] Correlation is significant at the level of 0.05 (bilaterally).

Source: Original work based on Eurostat database.

The study allows us to confirm the presence of a negative correlation ($r = –0.457$) between the Gini coefficient and public expenses for social purposes. Therefore, it may not be stated authoritatively that an increase in social expenses contributes to reducing income inequalities and *vice versa*. Similar conclusions may be drawn from the study of the correlation between the Gini index and the Gini gap. Among the examined measures, the mean equivalised annual net income was correlated the strongest to the Gini coefficient. Pearson's linear correlation coefficient reached the value of $r = –0.55$. The correlation between the variables is statistically strong and negative.

Research has shown that effective redistribution is not always tantamount to the high share of expenses on social purposes and tax revenues expressed in GDP. The level of income inequality, as a multidimensional category, depends on many different factors. Hence, one cannot expect a very strong correlation based on only one variable, e.g. the level of social expenses. It is not without reason that this correlation is subjected to research, modelling and interpretation by many scientists who try to reach a dependency – if not a linear one, then at least an indirect one.

CONCLUSIONS

The conducted analysis of the level of income inequalities in countries of the European Union allows us to formulate the following conclusions:

1. The evaluation of economies on the basis of the Gini coefficient has demonstrated that, in the analysed years, European Union countries have achieved the indicator in the range from 23 to 41, which, in view of the scale ranging from 0 to 100, may be considered satisfactory.
2. In all the years covered by the study, the largest income inequalities determined on the basis of disposable income occurred in the least affluent countries of the European Union – in Bulgaria, Romania, the Baltic countries – Latvia, Lithuania, and in Southern European countries – Spain, Portugal, Greece and Italy. The lowest level of income inequality was recorded in Slovakia, the Czech Republic, Slovenia and Finland.
3. The study conducted in the article allows to confirm the hypothesis assumed at the beginning, according to which the state, by means of taxes and social remittances, effectively contributes to a reduction in income inequalities measured using the Gini coefficient.
4. However, the impact of the redistribution policy on the level of income inequality in particular countries of the European Community is very different. Ireland, Denmark, Finland, Sweden and Hungary effectively use the taxation system and the social security system to reduce the level of inequality in market revenues. In other countries, such as Cyprus, Italy and Greece, this effect is much weaker.
5. Higher public expenses for social purposes (percentage of GDP) were not unambiguously tantamount to low values of the Gini coefficient. The variable is explained by another one with an accuracy of 20%. Therefore, it would be a mistake to say that providing for high social expenses has a direct impact on the development of disproportions in income.

REFERENCES

Bartak, J. (2018). Wpływ nierówności dochodowych na rozwój kapitału ludzkiego w krajach OECD po 1990 roku [The impact of income inequalities on the development of human capital in OECD countries after 1990]. Uniwersytet Rzeszowski, Rzeszów [doctorial thesis].

Blaug, M. (2000). Teoria ekonomii. Ujęcie retrospektywne [Theory of economics. Retrospective view]. Wydawnictwo Naukowe PWN, Warszawa.

Grzelak, A. (2016). Zróżnicowania dochodowe i przyczyny ich zmian w krajach objętych statystyką OECD [Income inequality and the reasons for its change in countries covered by OECD statistics]. Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego, 16 (31), 2, 94–105.

Jastrzębska, W., Lechwar, M. (2012). Nierówności ekonomiczne i kapitał ludzki z perspektywy polskich obszarów przyrodniczo cennych [Economic inequalities and human capital in environmentally valuable areas]. Nierówności Społeczne a Wzrost Gospodarczy, 24, 422–432.

Justyńska, I., Justyński, J. (2012). Historia myśli socjologiczno-ekonomicznej [History of sociological and economic thought]. Wolters Kluwer, Warszawa.

Kot, S. M., Ostasiewicz, K. (2019). Global and Regional Economic Inequality: Methods of Measurement and Evidences. Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław.

Kuznets, S. (1976). Wzrost gospodarczy narodów. Produkt i struktura produkcji [Economic growth of nations. Product and production structure]. PWE, Warszawa.

Litwiński, M. (2017). Nierówności dochodowe w ujęciu teorii ekonomii [Income inequalities in theory of economics]. Sensus Historiae, 29 (4), 71–788.

Marshall, A. (1890). Principles of Economics. Macmillan, London.

Mill, J. S. (2005). Utylitaryzm. O Wolności [Utilitarianism. About Freedom]. Wydawnictwo Naukowe PWN, Warszawa.

Nagaj, R. (2013). Rola państwa w niwelowaniu nierówności dochodowych [The role of State in reducing income inequality]. Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach, 139, 248–259.

Piketty, T. (2015). Kapitał w XXI wieku [Capital in the Twenty-First Century]. Wydawnictwo Krytyki Politycznej, Warszawa.

Ricardo, D. (2001). On the Principles of Political Economy and Taxation. Batoche Books, Ontario.

Sen, A. (2000). Nierówności. Dalsze rozważania [Inequality reexamined]. Społeczny Instytut Wydawniczy Znak, Kraków.

Smith, A. (1954). Badania nad naturą i przyczynami bogactwa narodów [An inquiry into the nature and causes of the Wealth of Nations]. Wydawnictwo Naukowe PWN, Warszawa.

Smith, A. (2004). The Theory of moral sentiments. Kessinger, Whitefish.

Stawicka, M. (2012). Ekonomiczne rozwarstwienie społeczeństwa Unii Europejskiej po światowym kryzysie gospodarczym – problematyka rozkładu dochodów [Economic stratification of society of the European Union after the world economic crisis – issue of the income differences]. Nierówności Społeczne a Wzrost Gospodarczy, 24, 125–135.

Szczepaniak, M. (2018). Nierówności dochodowe w wybranych krajach na tle systemów społeczno-gospodarczych [ncome inequalities in selected countries according to economic systems]. Nierówności Społeczne a Wzrost Gospodarczy, 55, 173–186.

Zwiech, P. (2013). Nierówności dochodowe w państwach europejskich – analiza przy wykorzystaniu współczynnika Giniego [Income Inequalities in European countries –analysis using the Gini coefficient]. [In:] J. Czech-Rogosz, S. Swadźba (eds.), Systemy gospodarcze i ich ewolucja. Aspekty mikro- i mezoekonomiczne [Economic systems and their evolution. Micro- and meso-economic aspects]. Wydawnictwo Uniwersytetu Ekonomicznego Katowice, 92–93.

POZIOM NIERÓWNOŚCI DOCHODOWYCH A POLITYKA REDYSTRYBUCYJNA W KRAJACH UNII EUROPEJSKIEJ

STRESZCZENIE

Artykuł podejmuje kwestie dotyczące poziomu nierówności dochodowych w krajach Unii Europejskiej w latach 2010 i 2018. Do realizacji celu badawczego wykorzystano literaturę przedmiotu oraz wtórne dane Eurostat. Uzyskane wyniki potwierdziły występowanie dużego zróżnicowania poziomu nierówności dochodowych między badanymi krajami. Państwami cechującymi się największymi nierównościami dochodowymi była Bułgaria oraz Litwa. Najmniejsze dysproporcje dochodowe niezależne od ingerencji państwa występowały w Czechach, na Słowacji oraz w Słowenii. Poza tym w 2018 roku zauważono relatywnie duży spadek nierówności w Polsce oraz wzrost nierówności w Luksemburgu, Szwecji oraz Holandii. Przeprowadzone w artykule badanie pozwala potwierdzić założoną na wstępie hipotezę, że w krajach Wspólnoty Europejskiej państwo poprzez podatki i transfery socjalne skutecznie wpływa na redukcję nierówności dochodowych. Odnotowano jednak spadek tzw. luki Giniego w większości krajów unijnych, co oznacza, że efektywności redystrybucji malała.

Słowa kluczowe: redystrybucja, dochód, nierówności dochodowe, transfery społeczne

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INFLUENCE OF DEMOGRAPHIC CHARACTERISTICS OF EMPLOYEES UPON THEIR TENDENCY TO UNDERTAKE ORGANIZATIONAL CITIZENSHIP AND COUNTERPRODUCTIVE WORK BEHAVIOURS

Dawid Szostek ✉

Nicolas Copernicus University in Toruń

ABSTRACT

The paper discusses the influence of gender, age, education and type of position held upon employees' tendency to undertake organisational citizenship behaviour (OCB) and counterproductive work behaviour (CWB). Particularly in Polish literature the relations have not been examined or discussed sufficiently. The author's aim is to verify four hypotheses stating that the above-mentioned variables affect involvement of employees in OCB and CWB. Thus, the author used data obtained from an online questionnaire given to 535 respondents, who are active workers. The obtained results did not provide any grounds for rejection of the hypotheses.

Key words: organizational citizenship behaviour, counterproductive work behaviour, sex, age, education, work position

JEL codes: J290; D230

INTRODUCTION

The total of factors determining workers' tendency to undertake organizational citizenship behaviour (OCB) and counterproductive work behaviour (CWB) may be divided into subject-related (typical of every employee) or situation-related (not affecting an employee, but depending on or independent of an organization) [Cohen et al. 2013]. The first group distinguishes between biological and personality factors, which belong to most often considered conditions of organizational behaviour among workers. In this case, particularly much attention is devoted to the following variables [Appelbaum et al. 2005]: sex (women tend to show higher ethical standards and, thus, commit to CWB more rarely and more often in organizational citizenship behaviours); age (usually positively correlated with OCB and negatively with CWB), education (the higher education of a worker, the lower his commitment to CWB and higher in OCB).

On the other hand, in relation to situation-related conditions, the literature most often considers types of positions held at work, i.e. a typically organizational variable. Researchers have proven that workers holding higher positions (white collar workers) tend to undertake CWB more rarely and OCB more often as compared to physical workers (blue collar workers) [Anjum and Parvez 2013].

Obviously, the above-mentioned relationships are not a standard and one can mention a lot of exceptions. For instance, it turns out that mobbing perpetrators are most often men at the age of 35–44, who have higher education [Boddy 2014]. Nevertheless, in the literature on the subject and, in particular, in Polish language,

Dawid Szostek https://orcid.org/0000-0001-6743-854X
✉dawidsz@umk.pl

there is clearly no comprehensive research on influence of particular personality and organizational variables upon workers' tendency to commit to OCB and CWB.

Therefore, the author's aim is to verify the following hypotheses:

- H1: a respondent's sex affects his/her commitment to CWB and OCB;
- H2: a respondent's age affects his/her commitment to CWB and OCB;
- H3: a respondent's education affects his/her commitment to CWB and OCB;
- H4: a respondent's position held affects his/her commitment to CWB and OCB.

In order to accomplish the aim stated, the author will use results of an online questionnaire conducted in Poland in 2017 among a group of 535 active workers.

ORGANIZATIONAL CITIZENSHIP BEHAVIOURS

Positive behaviours at work are most commonly referred to as organizational citizenship behaviours (OCBs). Organ understood the behaviours as "individual and voluntary behaviours, not resulting directly and expressly from a formal system of incentives, but contributing to increase of effectiveness of functioning of an organization" [Organ 1988, p. 4]. There are numerous terms and definitions of the types of behaviours in literature (see e.g. Nerdinger et al. [2011]). Authors agree that they may be oriented on an organization (organizational-focused; OCB-O) or upon specific persons, who are internal or external stakeholders of an organization (individual-focused; OCB-I).

A starting point for research on OCB was a relationship between worker satisfaction and their effectiveness. Organ noticed that satisfaction does not affect effectiveness directly, but it is OCB that acts as an intermediary to the influence [Organ 1997]. In order to measure the behaviours Smith et al. [1983] used an instrument composed of 16 formulations divided into two categories. Organ [1988] added another three categories and, thus, OCB were composed of:

- altruism/helping behaviour – readiness to cooperate; voluntary helping others without anticipation of personal benefits [Klotz and Bolino 2013];
- conscientiousness – particularly conscientious realization of tasks at work;
- kindness – consulting others before undertaking any activities at work;
- sportsmanship – peaceful withstanding of conditions of work;
- civic virtues – active and responsible participation in official life of an organization.

Presently, the most popular depiction of OCB distinguishes among seven basic categories of the behaviours [Podsakoff et al. 2000], including the three above-mentioned categories (altruism, sportsmanship and civic virtues) and: organisational compliance, organisational loyalty, individual initiative, self-development.

COUNTERPRODUCTIVE WORK BEHAVIOURS

Negative behaviours at work may be manifested in many ways, starting from minor offences (such as gossiping, taking company paper) and ending with serious offences (such as physical abuse of a worker, sex harassment, sabotage). They are most often referred to in literature as counterproductive work behaviours. Parks and Mount [2005] understand such behaviours as voluntary activities that infringe standards adopted by an organization and, thus, make it difficult for the organization to accomplish its aims. On the other hand, Spector defines the behaviours as "a set of various activities, which have one common feature, namely their voluntary character (contrary to accidental or forced behaviours) and are detrimental to or are intended to be detrimental to an organization or its stakeholders" (e.g. customers, other workers, executives) [Spector et al. 2006, p. 447]. There are also numerous other terms and definitions relating to negative behaviours (see e.g. Nerdinger et al. [2011]). However, their authors agree that the behaviours have to be undertaken voluntarily, are detrimental or may be detrimental to an organization and its stakeholders as well as infringe standards and targets adopted by an organization (see e.g. Nerdinger et al. [2011]).

Typologies of CWB most often used in practice include that suggested by Spector et al. [2006], who distinguished among five categories of such behaviours:

- abuse against others – the aim of such behaviours included psychical or physical harm to other

persons in an organization (e.g. by way of malicious comments or threatening);
- production deviance – deliberate limitation of effectiveness of an organization;
- theft – misappropriation of company property or that of other persons (e.g. colleagues);
- sabotage – deliberate destroying of components of organizational property, including tangible assets (e.g. machines) and intangible assets (e.g. image of an organization);
- withdrawal – limitation of one's work below minimum necessary for realization of aims (e.g. being late for work, unjustified absence).

Similar to OCB, CWB results from individual conditions (e.g. a worker's personality) and contextual conditions (including, organizational and extraorganizational conditions such as organizational culture, social consent) [Penney et al. 2011].

METHODOLOGY OF RESEARCH AND CHARACTERISTICS OF RESPONDENTS

The own research was realized using online questionnaire in 2017 among a group of active workers. The sample was selected deliberately, i.e. a request for participation the research (including a link to the questionnaire) was sent in May and November 2017 to such group of people (including students and workers in public and private sector). Finally, the author qualified 535 correctly completed questionnaires for the analysis. Table 1 includes basic characteristics of the tested sample.

OCB AND CWB IN THE SELECTED SAMPLE

The measurement of OCB used a scale of 20 items originating from a validated scale prepared by Fox and Spector [2009], so-called Organizational Citizenship Behaviour Checklist (OCB-C) – Table 2. Items of the scale (examples of behaviours) may be divided into three categories, i.e. behaviours directed towards other persons (OCB-P), towards an organization (OCB-O) and other forms of such behaviours (behaviours, which were not included in any of the two first categories by the authors). A respondent provided frequency of commitment to a given behaviour.

Table 1. The structure of a request included in the research

Category	Specification	*n*	%
Sector	private	280	52.3
	public	244	45.6
	no answer	11	2.1
Sex	female	372	69.5
	male	163	30.5
	no answer	0	0
Age	18–25 years	246	46.0
	26–35 years	67	12.5
	36–45 years	100	18.7
	46–55 years	21	3.9
	no answer	101	18.9
Work basis	full-time	357	66.7
	part-time	85	15.9
	unlimited work time	93	17.4
Position held	executive	21	3.9
	administrative/ office	305	57.0
	physical work (production services)	209	39.1
	no answer	0	0
Form of employment	employment contract (for a definite and indefinite term)	360	67.3
	civil law agreement	131	24.5
	other	36	6.7
	no answer	8	1.5
Education	vocational	4	0.7
	secondary	52	9.7
	higher	261	48.8
	student	218	40.7
	no answer	0	0

Source: Own research.

OCB-C scale ensured relatively high reliability of results obtained both for each of the categories of OCB as well as OCB as a whole. This is proven by the value of Cronbach alpha (Table 3).

Table 2. Items used in OCB measurement

Behaviour category	Specification
OCB-P	I listened to somebody, who had a problem with his/her work
	I listened to somebody, who had personal problems
	I changed my leave plans, days or hours of work in order to help a colleague
	I helped someone weaker carry something heavy
	I resigned from my own arguments in order to encourage or praise someone
	I defended someone, who has a hard day or was ill against a principal or other colleagues
OCB-O	I helped other colleagues get acquainted with work
	I suggested someone how to do his/her job better
	I suggested someone how to improve work environment
	I undertook additional work voluntarily
	I spoke well about my employer
	I resigned from a meal or break in order to complete something
Other OCB	I prepared a meal for somebody
	I advised a colleague
	I helped somebody with his/her learning or shared my knowledge
	I finished something for somebody, who had to leave earlier
	I helped somebody, who had a lot of work
	I answered a telephone for somebody, who was absent or busy
	I helped somebody to deal with a difficult customer or colleague voluntarily
	I decorated, cleaned or made a common place of work look more beautiful

Source: Fox and Spector [2009].

Table 3. Descriptive statistics for OCB

Behaviour category	M	*SD*	Cronbach alpha
OCB	2.619	0.510	0.918
OCB-O	2.716	0.428	0.753
OCB-P	2.421	0.635	0.817
Other OCB	2.639	0.489	0.804

Source: Own research.

On the other hand, the measurements used a 22-item scale prepared as based on a validated (and often used in practice of research) scale prepared by Spector et al. [2006], so-called Counterproductive Work Behaviour Checklist (CWB-C) – Table 4. Items of the scale can be attributed to one of the five categories of CWB already described by the author. Also in this case a respondent provide frequency of commitment to a given behaviour. Cronbach alpha for the scale were included in Table 5.

Figures 1 and 2 present frequency of undertaking of each of manifestations of OCB and CWB.

As regards OCB one may see that respondents engaged in behaviours directed towards other persons most often. On the other hand, more regular commitment can be seen most often in relation to behaviours directed towards an organization. The frequency of undertaking of other manifestations of OCB by respondents was, more or less, between the two other categories.

Table 4. Items used in CWB measurement

Behaviour	Specification
Abuse	I started or continued a gossip that was destructive or harmful for a colleague
	I was rude or impolite to a customer
	I blamed somebody at work for my own mistakes
	I provoked a quarrel with somebody at work
	I threatened somebody at work
	I hit or pushed somebody at work
	I offended or made jokes of somebody at work
Production deviance	I did my work incorrectly deliberately
	I worked slowly deliberately, when something had to be done
	I acted contrary to instructions deliberately
Sabotage	I wasted my employer's materials/stocks deliberately
	I destroyed equipment or property item deliberately
	I soiled or littered my place of work deliberately
Theft	I misappropriated something that belonged to my employer
	I took materials or tolls home without a consent
	I applied for payment for more hours than I worked
	I took my employer's money without a consent
	I took something that belonged to somebody at work
Withdrawal	I came too late for work without a consent
	I stayed at home claiming to be ill, while I was not
	I took a longer break than I was allowed to
	I left my work earlier than I was allowed to

Source: Spector et al. [2006].

Table 5. Descriptive statistics for CWB

Behaviour	M	*SD*	Cronbach alpha
CWB	1.287	0.195	0.876
Abuse	1.257	0.510	0.784
Production deviance	1.247	0.110	0.427
Sabotage	1.150	0.045	0.623
Theft	1.203	0.095	0.751
Withdrawal	1.569	0.228	0.567

Source: Own research.

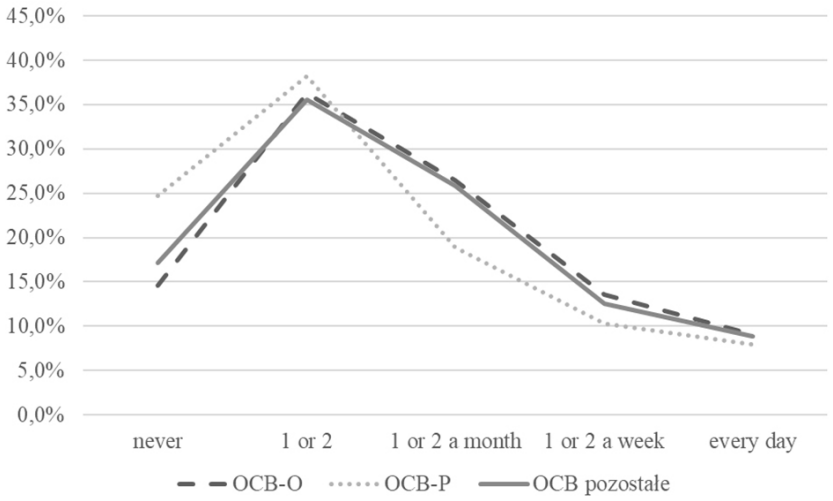

Fig. 1. Frequency of undertaking of OCB (n = 535)

Source: Own study.

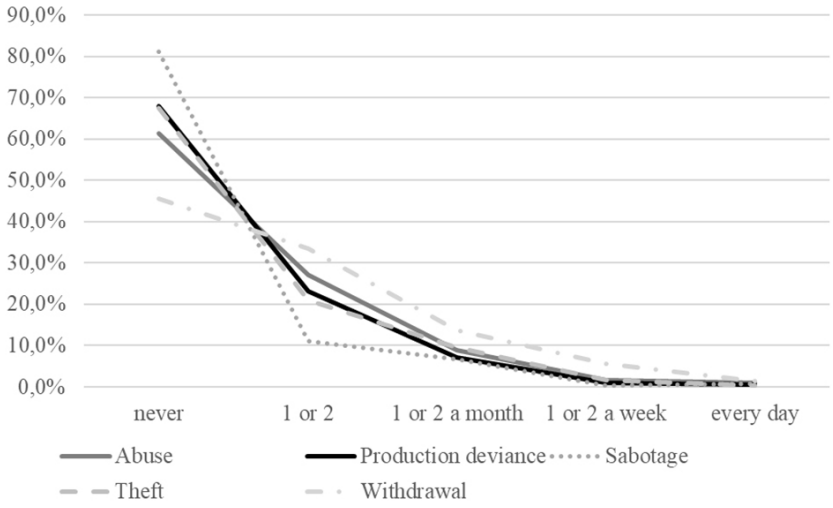

Fig. 2. Frequency of undertaking of CWB (n = 535)

Source: Own study.

As far as CWB is concerned, respondents tended to engage more often in categories of less detrimental behaviours (including, above all, withdrawal and minor forms of abuse against others). However, respondents undertook highly detrimental behaviours most rarely, as these were sanctioned with penalties, in particular, such as sabotage, theft and production deviance.

Further in this paper the author makes an attempt to determine, whether frequency of a respondent's commitment to OCB and CWB was affected by such variables as sex, age and type of position held at work.

INDIVIDUAL AND ORGANIZATIONAL VARIABLES *VERSUS* WORKERS COMMITMENT TO OCB/CWB

A respondent's sex

Analysing the data in Table 6 one may discern a difference between answers given by women and men as regards commitment to OCB. However, conclusions are not simple. Women tended to indicate 'never', 'once or twice' and 'once or twice a week' more often, whereas men – 'once or twice a month' and 'every day'.

On the other hand, as regards counterproductive work behaviours, one may see a bit lower commitment of women. However, it is only in case of frequency – 'once or twice a month' that women indicated the answer a bit more frequently. In the remaining cases, men indicated the answer.

Both in relation to OCB and CWB, differences with respect to a respondent's sex are statistically relevant, which is indicated by Pearson's χ^2 test. In both cases, the value of relevance is lower than the adopted relevance level of $\alpha = 0.05$ and hypothesis relating to independence of the variables analysed may be rejected in favour of an alternative hypothesis stating that such an independence does not exist (variables are dependent).

A respondent's age

Table 7 includes data relating to commitment of workers belonging to particular age groups in OCB and CWB. In case of OCB, the youngest respondents tended to undertake such behaviours rarely in an occasional manner (see values for 'never', 'once or twice', 'once or twice a month') and more frequently in a regular manner (see values for 'once or twice a week' and 'every day') as compared to workers belonging to older age groups (mainly 36–45 years old and 46–55 years old).

As regards CWB it can be seen that respondents aged 18–25 undertook such types of behaviours more rarely than workers belonging to older age groups. On the other hand, workers at the age of 35–45 and 46–55 engaged in such behaviours most frequently.

Also as regards a respondent's age, answers were differentiated in a statistically relevant manner both in relation to OCB and CWB.

Table 6. A respondent's sex v*ersus* commitment to OCB/CWB (%)

Sex	OCB				
	never	once or twice	once or twice a month	once or twice a week	every day
Female (372 persons)	19.1	37.6	22.0	13.0	8.3
Male (163 persons)	16.6	32.0	27.8	11.4	12.2
Sex	CWB				
	never	once or twice	once or twice a month	once or twice a week	every day
Female (372 persons)	80.7	12.6	5.6	0.7	0.3
Male (163 persons)	77.7	15.2	5.0	1.4	0.7

Source: Own study.

Table 7. A respondent's age *versus* commitment to OCB/CWB (%)

Age group	OCB				
	never	once or twice	once or twice a month	once or twice a week	every day
18–25 years (246 persons)	23.4	26.8	22.9	15.5	11.4
26–35 years (67 persons)	11.7	48.9	19.6	10.9	9.0
36–45 years (100 persons)	7.2	45.3	34.3	6.8	6.4
46–55 years (21 persons)	10.7	34.0	32.1	14.5	8.6
Age group	CWB				
	never	once or twice	once or twice a month	once or twice a week	every day
18–25 years (246 persons)	83.2	12.0	3.6	0.8	0.4
26–35 years (67 persons)	76.3	16.3	4.5	1.7	1.2
36–45 years (100 persons)	76.9	14.0	8.5	0.2	0.4
46–55 years (21 persons)	77.3	13.9	6.3	2.6	0.0

Source: Own study.

A respondent's education

The data in Table 8 relate to differences in frequency of commitment of workers in OCB and CWB in consideration of a respondent's education. In case of OCB, workers with vocational education tended to undertake such behaviour most rarely (an exception is only the category of 'once or twice a month', where workers with lowest education level tend to engage

Table 8. A respondent's education *versus* commitment to OCB/CWB

Educational level	OCB				
	never	once or twice	once or twice a month	once or twice a week	every day
Vocational (4 persons)	10.0%	30.0%	55.0%	5.0%	0.0%
Secondary (52 persons)	12.0%	28.5%	27.6%	17.7%	14.2%
Higher (261 persons)	13.9%	42.3%	23.9%	11.1%	8.8%
Student (218 persons)	25.3%	30.0%	22.1%	13.1%	9.4%
Educational level	CWB				
	never	once or twice	once or twice a month	once or twice a week	every day
Vocational (4 persons)	59.1%	13.6%	18.2%	9.1%	0.0%
Secondary (52 persons)	76.4%	17.3%	5.4%	1.0%	0.0%
Higher (261 persons)	78.0%	14.0%	6.5%	0.8%	0.8%
Student (218 persons)	83.2%	11.8%	3.9%	1.0%	0.2%

Source: Own study.

most often). OCB were undertaken most often by workers with secondary education (see the values for 'once or twice a week' and 'every day').

In relation to CWB it can be seen that workers with vocational education tended to commit to manifestations of such behaviours most often (see the value for 'never', 'once or twice a month' and 'once or twice a week'). Also workers with secondary and higher education and those in the course of their studies engaged in CWB, however the commitment had a more occasional form (see the value for 'once or twice').

A respondent's education also differentiated answers in a statistically relevant manner both in relation to OCB and CWB.

A respondent's type of position held

Table 9 included data concerning frequency of commitment of workers to OCB and CWB as divided into types of their positions held. In case of OCB it can be seen that such behaviours were most rarely undertaken by persons holding executive positions and most often by physical workers (see the values for 'never', 'once or twice' and 'once or twice a month'). In case of more regular manifestations of OCB (see the values for 'once or twice a week' and 'every day') commitment of workers holding each of the considered positions, was similar.

However, as far as CWB are concerned, conclusions are more complicated. It can be seen that persons holding executive positions indicated 'never' most often than workers holding other positions, however, in their case, one can see commitment to occasional CWB that is similar to other positions (see the value for 'once or twice'). In case of more regular undertaking of such behaviours, a slight advantage may be noted in relation to executive workers (see the values for 'once or twice a month' and 'once or twice a week').

A respondent's type of position held also differentiated answers in a statistically relevant manner both in relation to OCB and CWB (Table 10).

One should indicate to some limitations of the research, which could affect reliability of the results presented and, therefore, one should treat them with some distance. In the first place, there is the non-random selection of a sample (deliberate selection), which prevents transposition of conclusions onto the whole population of active workers. The biased character of the sample can be confirmed by the fact that nearly 90% of the respondents have higher or incomplete higher education. Another restriction was the measurement

Table 9. A respondent's type of position held *versus* commitment to OCB/CWB (%)

Position held	OCB				
	never	once or twice	once or twice a month	once or twice a week	every day
Executive (21 persons)	28.7	31.8	14.8	15.8	8.9
Administrative/office (305 persons)	20.0	35.5	22.4	11.5	10.5
Physical (209 persons)	14.8	36.8	26.6	13.6	8.1
Position held	CWB				
	never	once or twice	once or twice a month	once or twice a week	every day
Executive (21 persons)	82.3	13.4	2.4	1.3	0.6
Administrative/office (305 persons)	80.7	13.9	3.9	0.7	0.7
Physical (209 persons)	78.2	12.7	7.9	1.2	0.1

Source: Own study.

Table 10. Pearson's χ^2 test for relationship of sex, age, education and type of position held and OCB/CWB

Behaviour	Statistics	Sector type *versus*			
		sex	age	education	type of position
OCB	χ^2	29.822	84.890	76.562	56.675
	df	5	15	15	10
	relevance	0.000*	0.000*	0.000*	0.000*
CWB	χ^2	24.769	161.419	73.883	92.863
	df	5	15	15	10
	relevance	0.000*	0.000*	0.000*	0.000*

*Statistics for χ^2 at the level of $\alpha = 0.05$.

Source: Own study.

method adopted (online questionnaire), which gave the researcher little control over the process of data collection. The process could be affected by numerus interferences, which also contributed to lower reliability of data. Finally, it should be mentioned that the test did not identify a lot of other factors (apart from sex, age, education and type of position held), which affected answers given and, at the same time, conditioned differences in frequency of commitment of the respondents to OCB and CWB. Therefore, in the future it is worth conducting a research on a representative sample of workers with the use of quantitative and qualitative methods, which will make it possible to extend the level of analysis and increase reliability of results obtained.

CONCLUSIONS

Despite the indicated drawbacks of the research, the research relevantly results supplement the identified gap in knowledge of influence of the considered demographic characteristics of workers upon their tendency to undertake CWB and OCB. Most of all, the research does not provide any ground for rejection of research hypotheses made. Therefore, it should be stated that:

- a respondent's sex does not affect his/her commitment to CWB and OCB;
- a respondent's age affects his/her commitment to CWB and OCB;
- a respondent's education affects his/her commitment to CWB and OCB;
- a respondent's type of position held affects his/her commitment to CWB and OCB.

The conclusions seem to match results of the current research conducted by other authors mentioned at the beginning. The relationship between a respondent's sex, age, education and type of position held and OCB and CWB is, however, more complicated. Therefore, more extensive research should be conducted, including, in relation to the relationship between analysed individual variables and organizational variable and dimensions of counterproductive work behaviours and organizational citizenship behaviours.

REFERENCES

Anjum, M. A., Parvez, A. (2013). Counterproductive Behaviour at Work: A Comparison of Blue Collar and White Collar Workers. Pakistan Journal of Commerce and Social Sciences, 7 (3), 417–434.

Appelbaum, S. H., Deguire, K. J., Lay, M. (2005). The relationship of ethical climate to deviant workplace behaviour. Corporate Governance, 5 (4), 43–55.

Boddy, C. R. (2014). Corporate Psychopaths, Conflict, Employee Affective Well-Being and Counterproductive Work Behaviour. Journal of Business Ethics, 121, 107–121.

Cohen, T. R., Panter, A. T., Turan, N. (2013). Predicting Counterproductive Work Behaviour from Guilt Proneness. Journal of Business Ethics, 114, 45–53.

Fox, S., Spector, P. E. (2009). Organizational Citizenship Behaviour Checklist (OCB-C). Retrieved from http://shell.cas.usf.edu/~pspector/scales/ocbcpage.html [accessed 27.11.2017].

Klotz, A. C., Bolino, M. C. (2013). Citizenship and Counterproductive Work Behaviour: A Moral Licensing View. Academy of Management Review, 38 (2), 292–306.

Nerdinger, F. W., Blickle, G., Schaper, N. (2011). Formen des Arbeitsverhaltens. [In:] Arbeits- und Organisationspsychologie. Springer, Berlin, 409–423 https://www.researchgate.net/publication/225270532_Formen_des_Arbeitsverhaltens. DOI: 10.1007/978-3-642-16972-4_25 [accessed 21.06.2017].

Organ, D. W. (1988). Organizational citizenship behaviour: The good soldier syndrome. Lexington Books, Lexington.

Organ, D. W. (1997). Organizational Citizenship Behaviour: It's Construct Clean-Up Time. Human Performance, 10 (2), 85–97.

Parks, L., Mount, M. K. (2005). The "dark side" of self-monitoring: engaging in counterproductive behaviors at work. [In:] Academy of Management Annual Meeting Proceedings, Vol. 1, I1–I6. DOI: 10.5465/AMBPP.2005.18778875

Penney, L. M., Hunter, E. M., Perry, S. J. (2011). Personality and counterproductive work behaviour: Using conservation of resources theory to narrow the profile of deviant employees. Journal of Occupational and Organizational Psychology, 84, 58–77.

Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., Bachrach, D. G. (2000). Organizational Citizenship behaviours: A Critical Review of the Theoretical and Empirical Literature and Suggestions for Future Research. Journal of Management, 26 (3), 513–563.

Smith, C. A., Organ, D. W., Near, J. P. (1983). Organizational citizenship behaviour: Its nature and antecedents. Journal of Applied Psychology, 68 (4), 653–663.

Spector, P. E., Fox, S., Penney, L. M., Bruursema, K., Goh, A., Kessler, S. (2006). The dimensionality of counterproductivity: Are all counterproductive behaviours created equal? Journal of Vocational Behavior, 68, 446–460.

WPŁYW CECH DEMOGRAFICZNYCH PRACOWNIKÓW NA ICH SKŁONNOŚĆ DO ZACHOWAŃ OBYWATELSKICH I KONTRPRODUKTYWNYCH

STRESZCZENIE

W artykule omówiono wpływ płci, wieku, wykształcenia oraz rodzaju zajmowanego stanowiska pracy na skłonność pracowników do podejmowania zachowań obywatelskich (OCB) i kontrproduktywnych (CWB). Szczególnie w polskojęzycznej literaturze związki te nie zostały zbadane i omówione w sposób wyczerpujący. Celem autora jest weryfikacja czterech hipotez o tym, że wspomniane zmienne wpływają na zaangażowanie pracowników w OCB i CWB. Do realizacji tego celu wykorzystano dane uzyskane z ankiety internetowej na próbie 535 osób aktywnych zawodowo. Uzyskane wyniki nie dały podstaw do odrzucenia postawionych hipotez.

Słowa kluczowe: zachowania obywatelskie, zachowania kontrproduktywne, płeć, wiek, wykształcenie, stanowisko pracy

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ECONOMIC CONTEXTS OF DIFFERENCES IN DIGITAL EXCLUSION

Tomasz Śmiałowski ✉, Luiza Ochnio

Warsaw University of Life Sciences – SGGW

ABSTRACT

In the 21st century, the problem of digital divide is more and more dynamic. Lack of access to digital technology is now the same exclusion as once slavery, lack of access to education or to work. The paper presents the results of research on the impact of belonging to a socio-economic group and income on a scale and diversity of the digital divide of Polish households in 2003–2015. Author's digital divide indicator was used to assess the impact. In the analyzed period, the scale of digital divide is gradually decreasing, however, its level depends on the socio-economic group and the income. From all socio-economic groups only in the group of students the digital exclusion as marginal. However, the phenomenon of digital divide was the most noticeable among the groups of farmers, pensioners and retirees – almost 80% of people from these groups were excluded or at risk of digital divide. In the case of the second analyzed factor, the research has shown that with the increase in income, the scale of digital divide and its diversification were getting smaller.

Key words: ICT, income, socio-economic groups, inequalities, multidimensional data analysis

JEL codes: O33

INTRODUCTION

The development of information society caused that in Poland, as in other countries, modern information and communications technologies (ICTs) became an integral part of the functioning of both businesses as well as the society. The lack of clear boundaries in the use of ICTs in professional life and in private life, leads to a difficulty in estimating direct relationships between the development of information and communications technologies and the development of the economy. An additional problem in the accurate assessment of the influence of ICTs on the economy is the lack of a uniform methodology that would be established and accepted by all, which can be confirmed by the results of analyses performed so far. According to different estimates, in Poland, the ICTs are responsible for generating from 1.6 to 7.9% of GDP. The Boston Consulting Group (BCG), using the expenditure method, which measures GDP as the sum of domestic demand and the balance of trade, estimated that the internet economy in Poland in 2009 generated PLN 35.7 billion, which was 2.7% of GDP [Cimochowski et al. 2011]. Deloitte, which uses in its research a method including the areas of the economy, in which the Internet played a significant role: corporate sector (66.6%), public sector (18.8%), finance and insurance sector (14.6%), estimated that in 2010 the share of ICT in generating GDP in Poland was 4.8% or PLN 68 billion. This means that it doubled within the period of the last five years [Deloitte 2012]. According to research funded by the European Commission's Future Internet Public Private Partnership (FI3P), taking into account the Internet sector only, in 2010 the share of the internet economy in GDP was 1.6% or PLN 24 billion, being one of the lowest in the European Union, where the average was 4.1%. As a cause for this situation, authors of the report pointed out an "old" structure of the economy,

Tomasz Śmiałowski https://orcid.org/0000-0002-7559-9180; Luiza Ochnio https://orcid.org/0000-0001-8875-7945
✉tomasz_smialowski@sggw.pl; luiza_ochnio@sggw.pl

in which the gross value added of the production and main sectors (together with agriculture) was 32%, while for the countries of the EU-27 it was at a level of 24% [Hoorens et al. 2012]. However, analyses and forecasts of the Polish Ministry of Economy indicate that the share of the ICT sector in 2013 was 7.9% of GDP, and that in the coming decade it is to increase to a level of 15% [MG 2014].

Changes resulting from the popularization of information and communications technologies in the economy are also noticeable in households. In the years 1994–2015 the number of households equipped in various information and communications technologies grew dynamically [Śmiałowski and Jałowiecki 2012]. It was a result of a general increase in the level of wealth of the society and of a systematic decrease in costs, which had to be covered in order to gain access to these technologies. The expenditures on ICT and related services grew systematically in the years 1994–2015, both in the case of particular socio-economic groups, as well as for all households together. However, the level of spending was different for each of the socio-economic groups. The largest share of expenditures on ICT and related services was associated with self-employed households, and the smallest with farmers. The shares of expenditures on ICT out of the total, associated with the households of retirees and disability pension recipients, were the closest in terms of their size (Fig. 1).

Digital exclusion is among the most important consequences. Any exclusion leads to inequality and marginalization of a part of the society, in which it exists [Deaton 2013]. An aspect of digital exclusion, which is worthy of pointing out, is the lack of negative effects resulting from belonging to the digital exclusion sphere at first [Czapiński and Panek 2007]. The main reason is that the awareness of the need of using cutting-edge technologies is very low. This situation changes under certain circumstances, particularly at the moment of losing an old job and searching for a new one, or in cases of changing workplace conditions, which is related to the implementation of the modern ICT.

The development of civilization towards the information society causes that digital exclusion starts to be felt not only by individuals, but also on the scale of

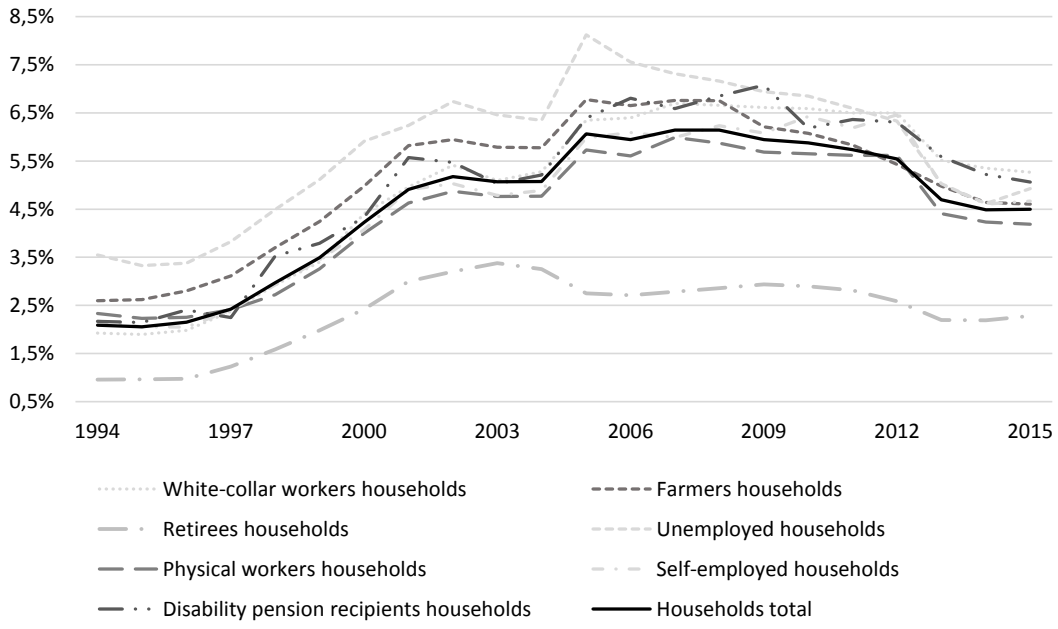


Fig. 1. Share of expenditures on ICT and related services in households total and in division on socio-economic groups

Source: Own preparation on the basis of GUS [1994–2015].

the whole country [GUS 2015, 2016]. Poland as a nation, represented by the government of the country, seeing the great potential of the information society, made it one of the goals for the current national policy [MSWiA 2008].

The goal of this article is to make an assessment of the influence of the economic conditions on the scale of and differences in digital exclusion of Polish households. Digital exclusion was defined in this research as "the differences between persons, households, companies and geographical areas on different socioeconomic levels, both with regard to their chances for access to information and communications technologies as well as the use of the technologies on the Internet for a wide range of activities" [OECD 2001].

MATERIAL AND METHODS

The implementation of the research goal, which was set forth, required identifying the economic factors that influence the scale of digital exclusion. An analysis of the literature and main data sources: the Social Diagnosis reports and the Statistics Poland (GUS) research results, pertaining to household budgets, allowed to determine two most important factors: belonging to a socio-economic group and income.

In the case of the first factor, a division into seven main socio-economic groups (SEGs) was accepted as the basis for the research being performed: employees (SEG 1), private entrepreneurs (SEG 2), farmers (SEG 3), disability pension recipients (SEG 4), retirees (SEG 5), students and college students (SEG 6) and the unemployed and other persons who are professionally inactive ("out of the workforce") (SEG 7) [Czapiński and Panek 2003–2015, GUS 2003–2015]. In the case of the second factor under analysis, a classification was accepted including three income groups (ICGs). The first group were persons, whose income did not exceed the minimum wage (ICG 1); the second group were persons, whose income was above the minimum wage, but did not exceed the national average (ICG 2); the third group were persons, whose income was above the national average (ICG 3)[1]. The grouping of persons according to the above income classification significantly helped to decrease the concentration of income around low values[2], in comparison to the empirical distribution of income[3]. In order to use variables easily, all variables were labeled with an abbreviated name constructed of two elements: a three-letter symbol of the variable and a number standing for the category of the variable.

The research on the level of and differences in the spheres of digital exclusion was divided into the four phases:

- determination of the digital exclusion index for every person, who is more than 14 years old, and an initial statistical analysis of the level of digital exclusion for the particular economic factors;
- verification of the statistically significant relationship between the degree of digital exclusion and the economic factor or its lack, with the chi-squared test of independence [χ^2 test] and the Pearson's contingency coefficient [Koronacki and Mielniczuk 2006];
- evaluation of the degree of differences in digital exclusion for the particular economic factors based on the Gini coefficient [Anand 1983, Dudek 2006] and the determination of the structure of differences with the use of the Theil index [Theil 1967, Jabkowski 2009];
- identification of interrelationships of differences between the degree of digital exclusion and the economic factor using the grade correspondence analysis (GCA, GCCA) [Szczesny 2002, Kowalczyk et al. 2004].

The evaluation of the level of and differences in digital exclusion was performed over two-year periods due to the nature of the data. The choice of a two-year period was related to the data collection method for the Social Diagnosis reports.

[1] Changes in the minimum wage amount and in the national average amount in particular years were taken into account in this research. There were two different minimum wage amounts in 2007, that is why an amount being their arithmetic average was used in this paper to be the minimum wage reference level.

[2] Skewness from 0.20 to 0.46; kurtosis from –0.71 to –0.87.

[3] Skewness from 3.52 to 5.73; kurtosis from 12.33 to 55.67.

In the first phase of the research, for every adult person the level of digital alienation was calculated based on the digital exclusion index [Śmiałowski 2018], according to the following formula:

$$wwc_j = \sum_{i=1}^{n} w_i \cdot x_{ij} \quad (1)$$

where:
x_{ij} – value of the i-th characteristic for the j-th observation;
w_i – the i-th characteristic.

Next, depending on the level of the digital exclusion index, every adult person was classified as belonging into one of four groups, according to the division method (2) (3) (4) (5) proposed by Nowak [1990]:
- DEG I – a person who is digitally excluded:

$$[\min wwc,\ \overline{wwc} - s(wwc)] \quad (2)$$

- DEG II – a person endangered with digital exclusion:

$$[\overline{wwc} - s(wwc),\ \overline{wwc}] \quad (3)$$

- DEG III – a person somewhat using the latest ICT solutions:

$$[\overline{wwc},\ \overline{wwc} + s(wwc)] \quad (4)$$

- DEG IV – a person fully benefitting from using the latest ICT solutions:

$$[\overline{wwc},\ s(wwc),\ \max wwc] \quad (5)$$

The obtained results were used to calculate the percentage shares of digital exclusion groups in the particular categories of a given differentiating factor according to the formula:

$$y_j = \frac{x_i}{\sum_{i=1}^{4} x_i} \quad (6)$$

where:
x_i – the number of persons in the i-th group of digital exclusion in the j-th category;
$\sum_{i=1}^{4} x_i$ – the total number of persons in the j-th category.

The calculated percentage shares were the basis for creating for both economic factors a table containing the profile of digital exclusion groups in subsequent years. Next, the average value of the characteristics analyzed in the research period was found based on the chronological average [Witkowska 2001, Sobczyk 2007]:

$$\bar{y} = \frac{1}{n+1} \sum_{t=1}^{n} y_t \quad (7)$$

where:
y_t – value of the researched characteristic in year t;
n – number of years.

RESEARCH RESULTS

The research, which was performed, showed that a socio-economic group affiliation as well as an income group affiliation both had a considerable influence on the level of and differences in digital exclusion. The obtained results were also confirmed by the analysis of relationships between the digital exclusion group association and the association with the groups determined based on the investigated differentiating factors. The analysis showed that both economic differentiating factors were statistically significant. The average value of the contingency coefficient for a socio-economic group was 0.427, and for an income group it was 0.170.

College and other school students were the only group out of all socio-economic groups, which was definitely dominated by persons who fully took advantage of the latest ICT solutions (the average value of the level of digital exclusion was 51.9% – Table 1). At the same time, the students were the only group characterized by a small share of digitally excluded persons (8.2%). On the other hand, digitally excluded persons were a group that definitely dominated (from 68.7 to 77.4%) among farmers, retirees, and disability pension recipients. The remaining exclusion groups (DEG II, DEG III, DEG IV), existing among farmers, disability pension recipients and retirees, were characterized by a small share in the digital exclusion profile. It was observed that only in the group of the unemployed and other professionally inactive persons the digital exclusion profile was similar to the general profile (determined for all persons).

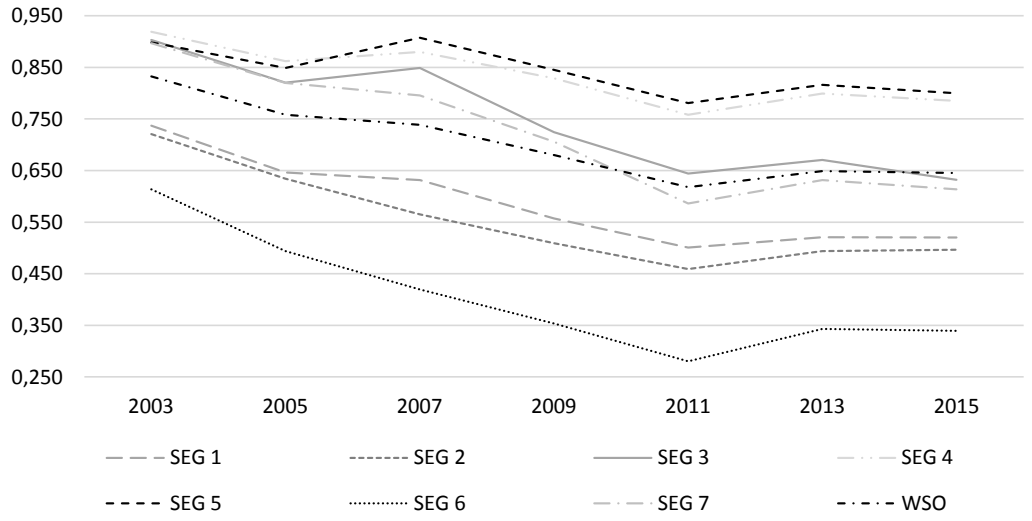
Table 1. Digital exclusion profile in individual socio-economic groups in 2003–2015

Socio-economic group	Average level of exclusion (%)						
DEG I	32.0	26.1	68.7	71.7	77.4	8.2	54.5
DEG II	13.4	14.8	9.7	5.1	4.1	11.7	11.3
DEG III	10.7	12.4	4.7	3.8	2.3	15.7	7.4
DEG IV	31.4	34.3	4.4	6.9	3.6	51.9	14.3

Source: Own preparation on the basis of Czapiński and Panek [2003–2015].

The domination of digitally excluded persons in particular socio-economic groups significantly influenced the level of differences in digital exclusion (Figs. 2 and 3). The group of college and other school students was characterized by definitely the smallest differences in digital exclusion (the average value of the Gini coefficient was 0.355). Entrepreneurs (0.485) and employees (0.514) were characterized by greater differences than the student group, although the differences were clearly smaller than differences for all persons overall (0.615). The unemployed and other professionally inactive persons (0.631) and farmers (0.623) were the groups for which the level of differences was closest to the level of differences for the whole population of the country. Definitely the greatest differences were observed in the group of disability pension recipients (0.729) and retirees (0.737).

The breakdown of the overall scheme of differences in digital exclusion in the investigated socio-economic groups revealed that definitely the greatest percentage shares in the overall differences belonged to the group of employees (29.6%) and the inter-group differences (24.2%). The unemployed and other professionally inactive persons (10.3%) and retirees (8.1%) were characterized by significantly smaller shares. Definitely the smallest shares belonged to the groups of farmers



WSO – total number of persons.

Fig. 2. The trend of dispersion of digital exclusion in particular socio-economic groups in 2003–2015

Source: Own preparation on the basis of Czapiński and Panek [2003–2015].

(2.0%), entrepreneurs (3.3%), disability pension recipients (4.5%) and students (5.5%).

The analysis of the overrepresentation map (Fig. 3) confirmed that substantial differences in the level of digital exclusion existed in all socio-economic groups. The groups of digitally excluded persons were characterized by a greater, in comparison to the average socio-economic structure, share of retirees, farmers, disability pension recipients, the unemployed and other professionally inactive persons, and by a smaller share of the groups of employees, entrepreneurs, students. The groups of persons fully taking advantage of the latest ICT solutions were characterized by an inverse relationship, that is, a smaller, in comparison to the average socio-economic structure, share of retirees, farmers, disability pension recipients, the unemployed and other professionally inactive persons, and by a greater share of employees, entrepreneurs, students. The digital exclusion groups: second and third, had the socio-economic structures similar to the group of persons fully taking advantage of the latest ICT solutions.

The research on the level of digital exclusion in socio-economic groups, performed with the use of the grade correspondence analysis, also revealed the existence of certain similarities between these groups. Four main categories were identified: the first – which consisted of retirees and farmers; the second – which consisted of disability pension recipients, the unemployed and other professionally inactive persons; the third – which consisted of employees, entrepreneurs; the fourth – which consisted of college and other school students. In the case of digital exclusion groups, the performed analysis allowed to identify three main categories: the first – which consisted of digitally excluded persons; the second – which primarily included persons belonging to the second and the third group of digital exclusion; the third – dominated by persons fully taking advantage of the latest ICT solutions.

The second discussed economic factor that influenced the differences in the level of digital exclusion, is the association with an income group. The performed research showed that along with an increase in income the share of the group of digitally excluded persons (DEG I) in the profile of exclusion was decreasing, while the share of the group of persons fully taking advantage of the latest ICT solutions (DEG IV) was increasing (Table 2). The highest levels of digital exclusion were observed in the first income group (the average value of the level of exclusion was 53.5%) and in the second income group (51.2%). In the first

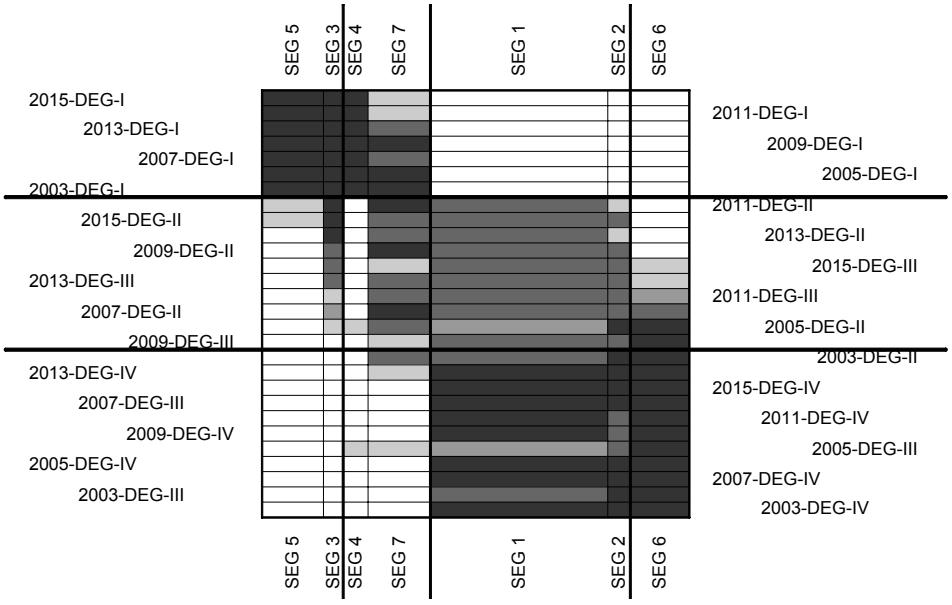


Fig. 3. Overrepresentation map of the socio-economic structure in the groups of digital exclusion in the years 2003–2015

Source: Own elaboration on the basis of Czapiński and Panek [2003–2015].

Table 2. Digital exclusion profile in individual income groups in 2003–2015

Socio-economic group	Average level of exclusion (%)		
DEG I	53.5	51.2	28.8
DEG II	8.9	10.3	12.0
DEG III	7.4	7.6	10.2
DEG IV	17.7	18.4	36.5

Source: Own elaboration on the basis of Czapiński and Panek [2003–2015].

two income groups, the group of persons fully taking advantage of the latest ICT solutions represented a definitely lower percentage (17.7 and 18.4%, respectively), and the two remaining digital exclusion groups represented the lowest percentage. In the highest income group, the group of persons fully taking advantage of the latest ICT solutions had the largest share in the digital exclusion profile (36.5%). Next, the percentage share of the digitally excluded persons was smaller (28.8%). Two remaining digital exclusion groups, similarly as in the first and the second income group, were characterized by the smallest share.

The research on the differences in digital exclusion in the income groups, similarly as in the case of socio-economic groups, showed that the share of excluded persons significantly influences the level of differences (Figs. 4–5). The differences in digital exclusion in the successive income groups and years were getting smaller. Definitely the smallest differences in digital exclusion characterized the highest income group (the average value of the Gini coefficient was 0.498). The differences in digital exclusion were clearly smaller than the differences in the income group: the first (0.638) and the second (0.623) and for all persons together (0.615). The overall differences were influenced the most by the two first income groups (32.7% and 39.4%, respectively). The highest income group was characterized by a significantly smaller share in the total differences in digital exclusion (11.9%). The shares of differences between groups (3.5%) were definitely the smallest.

The evaluation of overrepresentation (Fig. 5) confirmed that substantial differences in the level of digital exclusion existed in all income groups. The groups of digitally excluded persons were mostly characterized by a greater, with regard to the average structure of income, share of the first income group and a smaller share of the third income group. The groups of persons fully taking advantage of the latest ICT solutions were characterized by an inverse relationship, that is,

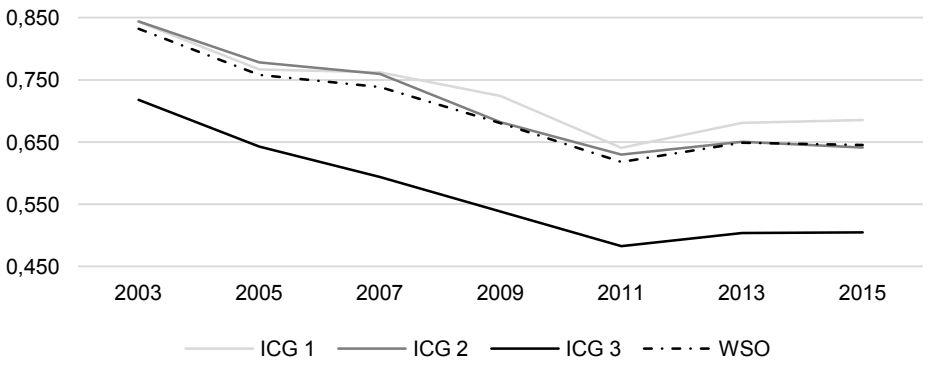


Fig. 4. The trend of digital exclusion dispersion in particular income groups in the years 2003–2015

Source: Own preparation on the basis of Czapiński and Panek [2003–2015].

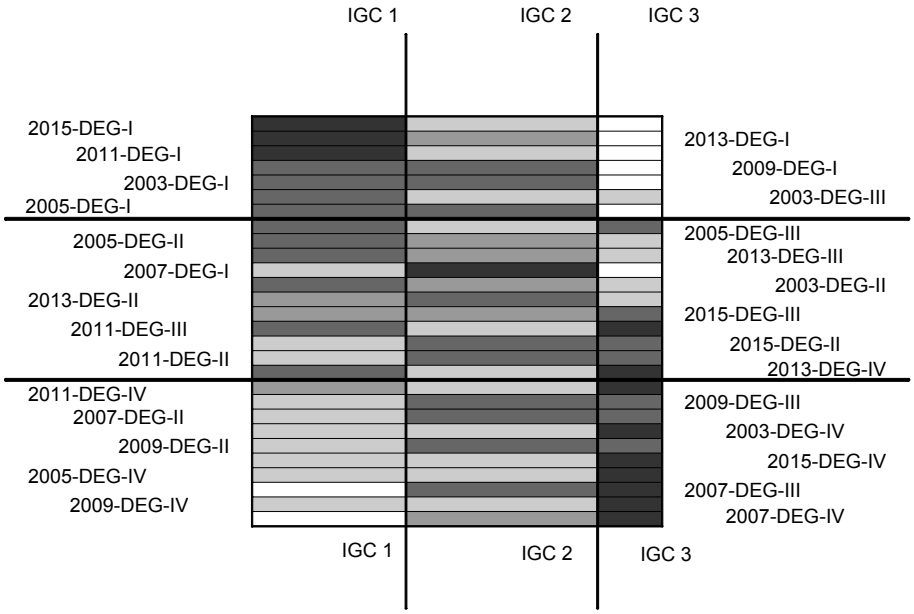


Fig. 5. Overepresentation map of income structure in digital excluded groups in years 2003–2015

Source: Own elaboration on the basis of Czapiński and Panek [2003–2015].

a smaller, with respect to the average structure of income, share of the first income group and a greater share of the third income group. The typical relationships were not observed in the second and the third group of digital exclusion.

The research on the level of digital exclusion in income groups with the help of the grade correspondence analysis also showed the lack of similarities between these groups. In the case of digital exclusion groups, similarly as in the socio-economic groups, the performed analysis allowed to separate three main categories: the first – which mostly consisted of digitally excluded persons; the second – which primarily included persons belonging in particular years of the research to the second and the third group of digital exclusion; the third – dominated by persons fully taking advantage of the latest ICT solutions.

CONCLUSIONS

The conducted research has shown that digital exclusion affects every socio-economic group and every income group. College and other school students were the only group out of all socio-economic groups, in which the phenomenon of digital exclusion existed to a marginal degree. Barely every fifth person in this group was digitally excluded or endangered with digital exclusion. On the other hand, the phenomenon of digital exclusion was most noticeable among farmers, retirees, and disability pension recipients – nearly 80% of persons in these groups were excluded or endangered with digital exclusion. In the case of the second economic factor, the obtained results showed that along with an increase in income the scale of digital exclusion was decreasing. The research also revealed that for both investigated factors certain similarities existed between digital exclusion groups. Three main categories were identified: the first – which mostly consisted of digitally excluded persons; the second – which primarily included persons belonging in particular years of the research to the second and the third group of digital exclusion; the third – dominated by persons fully taking advantage of the latest ICT solutions.

The obtained research results had their reflection in the level of differences in digital exclusion. Digital exclusion, however, still remains at a high level in spite of the successive decreasing. The domination of the group of excluded persons in the profile of digital

exclusion, and also the large share of the group of persons fully taking advantage of the latest ICT solutions, were the causes of the above relationships.

REFERENCES

Anand, S. (1983). Inequality and Poverty in Malaysia: Measurement and Decomposition. Oxford University Press, New York.

Cimochowski, G., Hutten-Czapski, F., Rał, M., Sass, W. (2011). Polska Internetowa. Jak internet dokonuje transformacji polskiej gospodarki [Internet Poland. How the Internet transforms the Polish economy]. Boston Consulting Group, Warszawa.

Czapiński, J., Panek, T. (2003–2015). Diagnoza Społeczna. Raporty za lata 2003–2015 [Social Diagnosis. Data of 2003–2015]. Warszawa.

Deaton, A. (2013). The Great Escape: Health, Wealth, and the Origins of Inequality. Princeton University Press, Princeton NJ.

Deloitte (2012). Wpływ przyspieszonego rozwoju szerokopasmowego dostępu do Internetu na polską gospodarkę. Raport [The impact of accelerated development of broadband Internet access on the Polish economy. Report]. Warszawa. Retrieved from http://eregion.wzp.pl/sites/default/files/pl_szerokopasmowy_internet_raport_lipiec_2012.pdf

Dudek, H. (2006). Nierówności dochodowe w gospodarstwach domowych rolników [Income inequalities in farmers' households]. Roczniki Naukowe SERiA, 8 (5), 29–33.

Główny Urząd Statystyczny (1994–2015). Budżety gospodarstw domowych. Dane za lata 1994–2015 [Household budget survey. Data of 1994–2015]. Warszawa.

Główny Urząd Statystyczny (2015). Społeczeństwo informacyjne w Polsce. Wyniki badań statystycznych z lat 2010–2014 [Information society in Poland. Results of statistical surveys in the years 2010–2014]. Warszawa––Szczecin.

Główny Urząd Statystyczny (2016). Społeczeństwo informacyjne w Polsce. Wyniki badań statystycznych z lat 2011–2015 [Information society in Poland Results of statistical surveys in the years 2011–2015]. Warszawa––Szczecin.

Hoorens, S., Elixmann, D., Cave, J., Li, M-S., Cattaneo, G. (2012). Towards a competitive European Internet industry. A socio-economic analysis of the European Internet industry and the Future Internet Public-Private Partnership. Report for the Commission of the European Communities, Information Society & Media Directorate-General. SMART 2009/0044. RAND Corporation, Cambridge.

Jabkowski, P. (2009). Miary nierówności społecznych – podstawy metodologiczne [Measures of social inequalities – methodological foundations]. [In:] K. Podemski (ed.), Spór o społeczne znaczenie społecznych nierówności [A dispute over the social significance of social inequalities]. Socjologia, 65. Wydawnictwo Naukowe UAM, Poznań, 26–41.

Koronacki, J., Mielniczuk, J. (2006). Statystyka dla studentów kierunków technicznych i przyrodniczych [Statistics for students of technical and life sciences]. 3rd edn. WNT, Warszawa.

Kowalczyk, T., Pleszczyńska, E., Ruland, F. (2004). Grade models and methods for data analysis. With applications for the analysis of data populations. Studies in Fuzziness and Soft Computing book series – STUDFUZZ, Vol. 151. Springer, Basel.

Ministerstwo Gospodarki (2014). Potencjał wzrostu sektora ICT w Polsce w perspektywie do 10 lat [Potential growth of the ICT sector in Poland in the perspective of up to 10 years]. Warszawa.

Ministerstwo Spraw Wewnętrznych i Administracji (2008). Strategia rozwoju społeczeństwa informacyjnego w Polsce do roku 2013 [Strategy for the development of the information society in Poland until 2013]. Warszawa.

Nowak, E. (1990). Metody taksonomiczne w klasyfikacji obiektów społeczno-gospodarczych [Taxonomic methods in the classification of socio-economic objects]. PWE, Warszawa.

Organisation for Economic Co-operation and Development (2001). Understanding the digital divide. OECD Publications, Paris.

Śmiałowski, T. (2018), Assessment of digital exclusion of polish households. Quantitative Methods in Economics, 19 (4), 98–106.

Śmiałowski, T., Jałowiecki, P. (2012). Terytorialne zróżnicowanie obszarów wykluczeń technologicznych [The geographic differences in technological exclusion in Poland]. Roczniki Naukowe SERiA, 14 (4), 125–130.

Sobczyk, M. (2007). Statystyka [Statistics]. Wydawnictwo Naukowe PWN, Warszawa.

Szczesny, W. (2002). Grade correspondence analysis applied to contingency tables and questionnaire data. Intelligent Data Analysis, 6 (1), 17–51.

Theil, H. (1967). Economics and Information Theory. North Holland Publishing Company, Amsterdam.

Witkowska, D. (2001). Metody statystyczne w zarządzaniu [Statistical methods in management]. Seria Wydawnictw Dydaktycznych Wydziału Organizacji i Zarządzania Politechniki Łódzkiej, Firma Księgarsko-Wydawnicza „Menedżer", Łódź.

Śmiałowski, T., Ochnio, L. (2019). Economic contexts of differences in digital exclusion. Acta Sci. Pol. Oeconomia 18 (2), 119–128, DOI: 10.22630/ASPE.2019.18.2.25

EKONOMICZNE UWARUNKOWANIA ZRÓŻNICOWANIA WYKLUCZENIA CYFROWEGO

STRESZCZENIE

W XXI wieku problem wykluczenia cyfrowego nabiera coraz większej dynamiki. Brak dostępu do technologii cyfrowej jest obecnie takim samym wykluczeniem jak niegdyś niewolnictwo, brak dostępu do edukacji lub pracy. W artykule przedstawiono wyniki badań dotyczących wpływu przynależności do grupy społeczno-ekonomicznej oraz dochodów na skalę i zróżnicowanie wykluczenia cyfrowego polskich gospodarstw domowych w latach 2003–2015. Do oceny wpływu wykorzystano autorski wskaźnik wykluczenia cyfrowego. Prowadzone badania wykazały, że w analizowanym okresie skala tego wykluczenia ulega stopniowemu zmniejszeniu, jednakże jego poziom był uzależniony od przynależności do danej grupy społeczno-ekonomicznej oraz wielkości dochodów. Ze wszystkich grup społeczno-ekonomicznych tylko wśród uczniów i studentów to zjawisko występowało w marginalnym stopniu. Z kolei wśród rolników, rencistów i emerytów było ono najbardziej zauważalne – blisko 80% osób z tych grup było wykluczonych lub zagrożonych wykluczeniem cyfrowym. W przypadku drugiego analizowanego czynnika badania wykazały, że wraz ze wzrostem dochodów skala wykluczenia cyfrowego oraz jego zróżnicowanie były coraz mniejsze.

Słowa kluczowe: ICT, dochody, grupa społeczno-ekonomiczna, zróżnicowanie, wielowymiarowa analiza danych

CONTENTS
SPIS TREŚCI

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