THE FOOD EXPENDITURE IN POLAND AND OTHER EUROPEAN UNION COUNTRIES – A COMPARATIVE ANALYSIS

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A b s t r a c t

The purpose of this paper is to present the results and conclusions of a comparative analysis of Poland and other European Union countries regarding the level of food expenditure, the share of food expenditure in the structure of total expenditure and the direction of changes in these areas that took place in the years 2006-2016.

The conducted analysis employed the desk research method using logical inference methods, based on Eurostat data and academic literature. For a more detailed analysis of the research findings, a cluster analysis was carried out using one of the hierarchical methods – the Ward's method.

The obtained results of the analyses permitted the conclusion that disproportionate food consumption in the household sector between individual countries should still be considered as large – although the differentiation clearly decreased in the analysed period. The less developed countries from Central and Eastern Europe are still far from adopting the service consumption model that would allow for a more complete satisfaction of higher-ranking needs.

WYDATKI NA ŻYWNOŚĆ W POLSCE I INNYCH KRAJACH UNII EUROPEJSKIEJ – ANALIZA KOMPARATYWNA

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A b s t r a k t

Celem artykułu jest przedstawienie wyników i wniosków z przeprowadzonej analizy porównawczej Polski i pozostałych krajów Unii Europejskiej w zakresie poziomu wydatków na żywność, udziału wydatków na żywność w strukturze wydatków ogółem oraz kierunków zmian w latach 2006-2016 w tych obszarach.

Badania na potrzeby wykonanej analizy przeprowadzono metodą *desk research* z wykorzystaniem metod wnioskowania logicznego, na podstawie danych Eurostatu oraz krytycznej literatury przedmiotu. W celu głębszego przeanalizowania otrzymanych wyników badań przeprowadzono *cluster analysis*, wykorzystując jedną z metod hierarchicznych – metodę Warda.

Uzyskane wyniki analiz pozwoliły na wyciągnięcie wniosku, że dysproporcje w zakresie konsumpcji żywności w sektorze gospodarstw domowych między poszczególnymi krajami należy uznać za wciąż duże – mimo że zróżnicowanie to w badanym okresie wyraźnie się zmniejszyło. Słabiej rozwiniętym krajom z Europy Środkowo-Wschodniej wciąż jeszcze daleko do realizacji usługowego modelu konsumpcji, pozwalającego na pełniejsze zaspokajanie potrzeb wyższego rzędu.

Introduction

Observations of contemporary societies lead to the conclusion that the higher the level of their wealth, the greater is their tendency to achieve an increasingly higher level and quality of life (Barcaccia *et al.*, 2013, p. 185-199; Andreoni & Galmarini, 2016, p. 227). One of the determinants of the level and quality of life, but also the level of modern patterns of consumption of society, is the share of food in the total value of consumption (Zlatevska & Spence, 2016, p. 380, 381). In countries with a high level of development, this share is at a low level, allowing for greater consumption of goods that meet the higher-ranking needs. In the opposite situation, when the value of food consumption is the main expenditure in the household budget, the possibility of satisfying higher needs becomes secondary.

The purpose of this paper is to indicate the differences and similarities between the individual Member States of the European Union in terms of the level of food expenditure, the share of food expenditure in the structure of total expenditure and the direction of changes which have taken place in these areas over the past ten years. The hypothesis, which was verified during the conducted

research, assumed that despite the declining distance in expenditure on food products between the highly developed EU countries and new members from Central and Eastern Europe, the latter are still far from the consumption-based service model, allowing for better fulfilment of higher-ranking needs. The paper also presents the clusters of Member States with a similar structure of food consumption in the household sector, obtained thanks to the use of one of the cluster analysis methods – the hierarchical Ward method.

Research methodology and source materials

The desk research method was employed for the purposes of this paper using logical reasoning methods, based on a critical analysis of the literature and available secondary sources.

The source material used in the work is the Eurostat data aggregate collected as part of the Classification of Individual Consumption by Purpose (COICOP)[1]. The data collected as part of COICOP enabled the analysis of basic consumption indicators of Polish households and their reference to the average values of indices calculated for the all EU Member States (EU28) (Maciejewski, 2018a, p. 349, 350).

Moreover, to describe the collected research material, a cluster analysis was used, of which numerous applications in solving research problems are highlighted by Walesiak (2004, p. 344-347). The purpose of the cluster analysis was to group and describe the Member States of the European Union according to the level of expenditure on particular food groups. For this purpose, one of the hierarchical agglomeration methods was adopted – the Ward method – used with the square of the Euclidean distance. In this method, the variance analysis is used to estimate the distance between clusters. The measure of the distances between objects (clusters) is the intra-group variance for the group formed from the combination of these objects (clusters). The Ward method aims to minimize the sum of the squares of deviations within the clusters. The ESS (Error Sum of Squares) is a measure of the diversity of concentration in relation to the mean values. The applied method is considered very effective, although it aims to create small-sized clusters (Walesiak, 2009, p. 413-417; Migdał-Najman & Najman, 2013, p. 179-194). The IBM SPSS Statistics 24 program was used for the calculations.

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[1] COICOP is one of the families of consumption classifications by purpose, developed and recommended by the United Nations (UN). COICOP is also used in other important areas of statistics, e.g. national accounts, household budget survey (HBS) and purchasing power parity (PPP). This classification, in the HBS, PPP and HICP studies, complies with the current version of COICOP published by the UN, at the two, three and four-digit levels, but for each of these three statistical domains, Eurostat has developed more detailed versions, adopting this classification to the needs of individual statistical surveys (COICOP/HICP, COICOP/HBS and COICOP/PPP) (*Systemy ważenia w badaniach…*, 2013).

Food expenditure against the level and structure
of total consumption in the household sector

The comparison of consumption in individual countries of the European Union (EU) in terms of goods and service groups as well as changes taking place in this respect are possible thanks to Eurostat statistics (Addessi, 2018, p. 18-20). They present, among others, data on the level and structure of individual consumption in the household sector. Data on the level of consumption, expressed as expenditure per inhabitant in 2016, show apparent differences between the Member States (Tab. 1). The highest level of total consumption, EUR 31,000 per inhabitant, was held by Luxembourg. Luxemburg's leading position has been visible for the past few decades, which has also been indicated by other authors (Kuśmierczyk & Piskiewicz, 2012, p. 84). High consumption expenditure, exceeding EUR 20,000 per capita, was specific to highly developed countries, the so-called old EU: Great Britain, Denmark, Austria, Finland and Sweden. In turn, the lowest value of individual consumption in the household sector was recorded by the new EU Members from post-communist countries: Bulgaria (EUR 4,400), Romania (EUR 5,000) and Hungary (EUR 5,900). Poland, with the amount of EUR 6,500 per inhabitant, was in the 24th position, just above the three previously mentioned countries. The difference between Luxembourg with the highest expenditure and Bulgaria with the least expenditure was sevenfold. Between Luxembourg and Poland there was more than a 4.5-fold difference.

The countries with a high expenditure on total consumption were also characterized as having a high expenditure on food and non-alcoholic beverages. Luxembourg is also here in the first place. In 2016, every resident of this country spent 2,919 euros on food consumption. The Swedes (2,488 euros), Finns (2,456 euros) and Belgians (2,454 euros) should be mentioned immediately after the inhabitants of Luxembourg. Poles only spent more on food products than Bulgarians and Hungarians. Analysing the level of expenditure on food and non-alcoholic beverages in the EU, the difference between the highest spending Luxembourg and the least spending Bulgaria was almost 3.5-fold, and between Luxembourg and Poland – just over 2.5-fold. Therefore, these differences are not as great as in the case of the described dissimilarities in expenditure on total consumption. This is obviously due to the necessity of purchasing food products to satisfy the basic needs of hunger and thirst, but also to the lower level of prices of these goods in less developed countries.

Comparing the expenditure on food and non-alcoholic beverages in 2016 with the 2006 figures, it can be concluded that in general they were growing just as the total consumption expenditure (Tab. 1). The expenditure on food products grew much faster than the expenditure on total consumption mainly in post-communist countries, predominantly in Bulgaria, Estonia, and the Czech Republic, but also in Cyprus. The expenditure on food products grew much

Household expenditure on total consumption and consumption of food
and non-alcoholic beverages in EU

Countries	Total consumption			Food and non-alcoholic beverages		
	Expenditure per inhabitant (in euro)		2006=100	Expenditure per inhabitant (in euro)		2006=100
	2006	2016		2006	2016	
European Union (28 countries)	13,800	15,900	115.2	1,655	1,946	117.6
European,Union (15 countries)	16,400	18,300	111.6	1,864	2,123	113.9
Austria	17,300	21,300	123.1	1,708	2,060	120.6
Belgium	15,100	18,200	120.5	1,899	2,454	129.2
Bulgaria	2,500	4,400	176.0	416	852	204.8
Croatia	:	:	:	1,226	1,419	115.7
Cyprus	15,000	16,400	109.3	1,909	2,382	124.8
Czech Republic	5,900	8,000	135.6	858	1,287	150.0
Denmark	19,200	22,400	116.7	2,076	2,544	122.5
Estonia	5,700	8,500	149.1	1,004	1,725	171.8
Finland	15,700	20,500	130.6	1,859	2,456	132.1
France	15,500	17,600	113.5	1,956	2,345	119.9
Germany	15,900	19,200	120.8	1,692	2,032	120.1
Greece	13,200	11,900	90.2	1,992	2,042	102.5
Hungary	4,900	5,900	120.4	821	1,042	126.9
Ireland	18,500	18,700	101.1	1,720	1,706	99.2
Italy	15,900	17,000	106.9	2,334	2,423	103.8
Latvia	4,800	7,800	162.5	896	1,418	158.3
Lithuania	4,800	8,700	181.3	1,136	1,921	169.1
Luxembourg	27,800	31,000	111.5	2,533	2,919	115.2
Malta	9,400	12,400	131.9	1,324	1,546	116.8
Netherlands	16,000	17,900	111.9	1,673	2,092	125.0
Poland	4,400	6,500	147.7	918	1,103	120.2
Portugal	10,300	12,200	118.4	1,631	2,066	126.7
Romania	3,100	5,000	161.3	911	1,471	161.5
Slovakia	4,700	8,000	170.2	806	1,426	176.9
Slovenia	8,500	11,100	130.6	1,234	1,636	132.6
Spain	13,300	14,300	107.5	1,701	1,825	107.3
Sweden	16,000	20,200	126.3	1,926	2,488	129.2
United,Kingdom	21,700	22,700	104.6	1,726	1,832	106.1

: – data not available

Source: own elaboration and calculations based on Eurostat data (nama_10_co3_p3, naida_10_gdp, prc_ppp_ind) – extracted on 29.06.18.

slower in Malta and Lithuania, whereas it was the slowest in Poland, where in the analysed period food expenditure increased by 20%, and expenditure on total consumption by nearly 48%.

As already indicated in the introduction, one of the determinants of the standard of living and the level of modern consumption is the share of food products in the total value of consumption (Tab. 2). In countries with

The structure of individual household consumption

Countries	CP01		CP02		CP03		CP04		CP05	
	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016
Austria	9.9	9.7	3.3	3.3	6.1	6.1	21.1	22.4	6.6	6.6
Belgium	12.6	13.4	4.1	4.3	4.7	4.3	23.6	24.5	5.7	6.2
Bulgaria	17.7	19.5	6.9	5.2	3.8	3.2	17.8	19.3	6.6	5.0
Cyprus	12.8	14.3	5.2	5.9	5.7	4.9	15.4	15.9	5.7	4.3
Czech Republic	14.5	16.0	7.1	8.4	4.1	3.6	24.7	25.6	5.7	5.5
Denmark	10.8	11.4	3.9	3.5	4.4	4.2	26.0	29.1	5.4	5.0
Estonia	17.8	20.3	8.1	8.5	6.5	6.8	18.1	17.6	5.1	4.5
Finland	11.8	12.0	5.1	4.4	4.9	4.3	24.3	28.4	5.3	4.9
France	12.8	13.4	3.5	3.8	4.6	3.8	24.2	26.5	5.4	4.9
Germany	10.6	10.6	3.4	3.2	5.1	4.5	24.5	23.9	6.9	6.8
Greece	15.1	17.2	3.9	5.0	5.1	3.8	17.6	20.5	5.3	2.8
Hungary	16.5	17.7	6.9	7.6	3.2	3.6	19.1	19.2	5.9	4.4
Ireland	9.2	9.1	6.1	5.6	4.7	3.9	19.5	23.3	6.6	4.3
Italy	14.7	14.2	4.2	4.1	6.8	6.2	20.7	23.6	7.0	6.2
Latvia	18.9	18.2	7.4	7.9	5.3	5.8	19.8	21.2	3.8	4.0
Lithuania	23.9	22.2	6.8	6.4	7.8	5.9	14.8	15.6	5.9	6.5
Luxembourg	9.0	9.4	9.4	8.5	5.2	5.6	22.1	24.3	6.2	5.7
Malta	14.1	12.4	4.5	4.0	5.4	4.6	11.1	10.4	7.8	7.0
Netherlands	10.5	11.7	3.0	3.2	5.4	5.1	20.4	23.5	6.3	5.4
Poland	20.9	17.1	7.0	6.1	4.6	5.2	22.1	21.2	4.3	5.3
Portugal	15.8	16.9	3.6	3.1	6.5	6.3	14.3	18.8	6.2	5.1
Romania	29.1	29.4	3.9	5.7	3.9	3.4	20.0	21.5	5.3	4.5
Slovakia	17.2	17.8	5.1	5.1	4.0	4.0	26.7	24.4	5.5	6.0
Slovenia	14.6	14.8	5.1	5.3	5.4	5.5	19.1	19.7	5.8	5.0
Spain	12.8	12.8	3.8	3.8	5.5	4.4	18.0	22.3	5.3	4.2
Sweden	12.0	12.3	3.5	3.6	5.0	4.8	26.6	26.0	5.1	5.4
United Kingdom	7.9	8.1	4.1	3.6	5.1	5.5	25.7	27.0	5.2	4.8

[a] No statistical data on Croatia; [b] data for Romania for 2015.

Where: CP01 – Food and non-alcoholic beverages; CP02 – Alcoholic beverages. tobacco and narcotics; CP03 – Clothing and footwear; CP04 – Housing. water. electricity. gas and other fuels; CP05 – Furnishings. household equipment and routine household maintenance;

a high level of economic development, this share is at a low level. In 2016, the United Kingdom (8.1%), Ireland (9.1%), Luxembourg (9.4%) and Austria (9.7%) had the lowest indicators, the highest, in turn, were in Romania (29.4%), Lithuania (22.2%), and Estonia (20.3%). In Poland, the value of consumption of food and non-alcoholic beverages accounted for 17.1% of the total consumption fund and was similar to those in Slovakia (17.8%), Hungary (17.7%), Greece (17.2%)

Table 2

in the European Union^a in 2006 and 2016^b (percentage of total)

CP06		CP07		CP08		CP09		CP10		CP11		CP12	
2006	2016	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016
3.7	3.9	13.5	11.9	2.6	1.8	10.1	10.1	0.8	0.9	11.5	13.3	10.8	10.1
5.6	6.3	12.1	11.0	2.6	2.2	9.3	8.4	0.4	0.4	5.6	6.4	13.7	12.6
4.2	6.4	17.0	14.0	4.7	4.8	7.1	7.8	0.8	1.1	8.0	6.6	5.3	7.0
4.4	5.1	14.8	12.1	3.2	3.1	6.8	5.8	2.3	2.7	15.1	17.2	8.5	8.8
2.2	2.4	10.4	9.8	3.6	2.7	10.6	8.7	0.6	0.5	8.1	8.7	8.4	8.0
2.7	2.9	13.7	11.8	1.9	2.2	12.3	10.9	0.7	0.8	5.4	6.3	12.7	11.9
3.0	3.2	12.9	11.3	3.0	2.7	9.4	8.2	1.0	0.5	6.9	8.3	8.1	8.1
4.3	4.6	13.1	11.9	2.7	2.3	12.0	10.6	0.4	0.4	6.7	6.4	9.3	9.8
3.9	4.2	13.9	13.2	3.2	2.6	9.2	8.0	0.4	0.5	6.6	7.0	12.3	12.1
4.3	5.3	14.7	14.4	2.9	2.9	9.3	9.1	0.7	0.9	4.8	5.4	12.7	13.0
5.3	4.4	15.1	13.5	3.7	4.4	4.8	4.5	2.4	2.1	13.8	14.3	7.9	7.6
4.0	4.9	15.5	12.4	3.9	3.8	8.5	7.1	1.7	1.7	6.1	9.3	8.6	8.3
3.3	5.1	12.6	13.5	3.5	2.6	7.1	6.5	2.2	2.7	12.9	15.7	12.3	7.8
3.1	3.5	13.3	12.2	2.9	2.3	7.0	6.6	0.9	1.0	9.0	10.2	10.4	9.9
3.7	4.6	13.5	11.7	3.3	2.8	8.7	9.4	2.0	1.4	8.5	7.0	5.0	6.0
4.3	5.1	15.9	15.1	2.4	2.7	6.8	8.2	0.8	0.5	2.7	3.4	7.9	8.5
1.7	2.1	18.3	15.4	1.6	1.6	6.5	6.3	0.6	0.9	7.1	7.5	12.3	12.8
3.9	3.8	12.5	12.0	3.6	3.6	10.2	10.2	1.1	1.7	15.1	19.2	10.6	11.1
2.6	3.6	14.0	12.5	4.2	3.2	11.4	10.8	0.6	0.8	7.2	8.2	14.5	12.1
4.0	5.6	10.0	12.1	3.2	2.4	7.4	7.9	1.3	1.0	2.9	3.2	12.3	13.0
4.5	5.1	15.0	12.7	3.2	2.4	7.5	6.1	1.1	1.2	10.6	11.8	11.7	10.6
3.1	5.9	18.0	11.3	2.0	4.1	4.7	5.9	1.8	2.0	5.5	2.2	2.7	4.1
3.3	2.6	7.7	7.5	3.7	3.4	8.6	10.2	1.5	1.6	7.3	6.0	9.3	11.3
3.5	3.8	15.2	15.9	3.4	3.0	10.9	8.5	1.2	1.3	6.4	7.3	9.5	10.0
3.3	4.0	12.0	11.0	2.6	2.6	8.2	7.3	1.4	1.9	17.2	16.3	10.0	9.4
3.2	3.5	13.9	12.7	3.4	3.0	11.5	11.0	0.3	0.3	5.1	6.4	10.4	10.9
1.5	1.8	13.2	13.4	2.0	2.0	10.8	9.5	1.2	1.8	9.2	9.5	14.2	13.0

CP06 – Health; CP07 – Transport; CP08 – Communications; CP09 – Recreation and culture; CP10 – Education;   CP11 – Restaurants and hotels; CP12 – Miscellaneous goods and services.

Source: own elaboration and calculations based on Eurostat data (nama_10_co3_p3) – extracted on 29.06.18.

and the Czech Republic (16.0%). What is worth noting, in 2016, compared to 2006, the share of expenditure on food and non-alcoholic beverages in the total value of consumption in the Member States was higher, although the change can hardly be considered significant. These shares only decreased in seven countries. The largest decrease was observed in Poland from 20.9% in 2006 to 17.8% in 2016.

Expenditures on food and non-alcoholic beverages are a significant item in the budgets of EU households. In 2016, in countries such as Bulgaria, Estonia, Lithuania, Romania and Malta, they were still the largest group of expenditure. In most countries, the amount of expenditure on food products gives way only to the expenditure on housing and energy. In a few countries, expenditure on food and non-alcoholic beverages falls to further positions, burdening household budgets to a lesser extent than expenditure on transport, recreation and culture, restaurants and hotels. However, this is the case only in countries with very high economic development, such as: Great Britain and Austria (Tab. 2).

The high share of expenditure on food products has a direct impact on the ability to meet other needs, especially higher-ranking ones. In such cases, one can speak of a 'food consumption model' (Kuśmierczyk & Piskiewicz, 2012, p. 85). As the level of wealth increases, the food model turns into 'an industry consumption model', in which expenditure on non-food goods predominates. Further development of societies and economies, and consequently the growing level of welfare, leads to a 'service consumption model' in which expenditure on services predominates, accounting for 50% and more of the total household's expenditure on consumption (Dąbrowska, 2008, p. 151; Ozimek & Żakowska-Biemans, 2011. p. 139, 140).

Based on the data presented in Table 3, it can be noted that countries such as Ireland, the United Kingdom, Finland, Denmark, the Netherlands or Austria have a consumption expenditure structure that is closest to the service consumption model (Healy, 2014, p. 796-802)[2]. These countries are characterized by a relatively low expenditure on food and non-alcoholic beverages (oscillating around 10%) and over 50% on services. Spain (54.4%), Greece (54.3%) and Cyprus (53.3%) have larger than a 50% share of expenditure on services in the general consumption fund. In these cases, however, such a large share of expenditure on services in the total consumption structure is influenced not only by economic factors (income situation, prices), but also by factors of a cultural nature, often related to the tradition of a given country (Godziszewski *et al.*, 2013, p. 52-54). On the other hand, the countries of the former USSR, such as Lithuania, Estonia

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[2] The data included in Tab.3 were created as a result of COICOP disaggregation, visible in Tab.2, from two-digit level to three- and four-digit levels. This made it possible to clearly assign particular groups of expenditures to the category of food and non-alcoholic beverages, non-food items and services. Only sub-categories CP056 'goods and services for routine housekeeping' included in category CP05 are not included in the calculations due to the lack of further sub-categories of 'goods' and 'services'.

and the countries of the former Eastern Bloc, especially Romania, Slovenia and Slovakia, seem to be currently the furthest from the service consumption model. The group of these countries also includes Poland which, with expenditure on services amounting to 35.2% of the total consumption expenditure, is only ahead of Lithuania (28.0%) – Table 3.

Table 3

The structure of individual consumption of households in the European Union[a] in 2006 and 2016[b] – and consumption models (percentage of total)

Countries	Food and non-alcoholic beverages		Non-food goods		Services	
	2006	2016	2006	2016	2006	2016
Austria	9.9	9.7	42.0	39.8	48.1	50.5
Belgium	12.6	13.4	36.9	38.5	47.8	48.1
Bulgaria	17.7	19.5	40.5	38.5	41.8	42.0
Cyprus	12.8	14.3	39.7	32.4	47.5	53.3
Czech Republic	14.5	16.0	36.9	36.8	48.6	47.2
Denmark	10.8	11.4	43.3	37.9	45.9	50.7
Estonia	17.8	20.3	44.2	42.8	38.0	36.9
Finland	11.8	12.0	40.3	36.7	47.9	51.3
France	12.8	13.4	41.1	38.6	46.1	48.0
Germany	10.6	10.6	42.5	40.9	46.9	48.5
Greece	15.1	17.2	33.5	28.5	51.4	54.3
Hungary	16.5	17.7	43.7	39.6	39.8	42.7
Ireland	9.2	9.1	34.2	30.5	56.6	60.4
Italy	14.7	14.2	43.0	39.5	42.3	46.3
Latvia	18.9	18.2	40.8	41.3	40.3	40.5
Lithuania	23.9	22.2	50.2	49.8	25.9	28.0
Luxembourg	9.0	9.4	49.5	44.6	41.5	46.0
Malta[c]	14.1	12.4	47.1	44.0	38.8	43.6
Netherlands	10.5	11.7	41.5	37.7	48.0	50.6
Poland	20.9	17.1	41.1	47.7	38.0	35.2
Portugal	15.8	16.9	42.5	37.0	41.7	46.1
Romania	29.1	29.4	35.5	35.2	35.4	35.4
Slovakia	17.2	17.8	42.4	42.4	40.4	39.8
Slovenia	14.6	14.8	44.9	45.3	40.5	39.9
Spain	12.8	12.8	35.3	32.8	51.9	54.4
Sweden	12.0	12.3	41.1	39.7	46.9	48.0
United Kingdom	7.9	8.1	38.3	36.8	53.8	55.1

[a] No statistical data on Croatia; [b] data for Romania for 2015; [c] data for Malta do not account for social protection, insurance and financial services n.e.c.
Source: own elaboration and calculations based on Eurostat data (nama_10_co3_p3) – extracted on 29.06.18.

The level and structure of expenditure on food and non-alcoholic beverages

The aggregate of expenditure on food and non-alcoholic beverages, in comparison with other categories of consumption, provides a lot of information about changes in households of the individual EU Member States. Thanks to Eurostat statistics, it is also possible to analyse individual groups of expenditure on food products and conduct comparative research in this area (Ghinararu, 2017, p. 437-445).

The level and structure of expenditure on food and non-alcoholic beverages

Countries	Total food and non-alcoholic beverages		Bread and cereals		Meat		Fish	
	euro	%	euro	%	euro	%	euro	%
Austria	2,060	100.0	393	19.1	424	20.6	71	3.4
Belgium	2,454	100.0	459	18.7	625	25.5	140	5.7
Bulgaria	852	100.0	122	14.3	156	18.3	19	2.2
Croatia	1,419	100.0	266	18.7	235	16.6	55	3.9
Cyprus	2,382	100.0	449	18.8	427	17.9	104	4.4
Czech Republic	1,287	100.0	184	14.3	304	23.6	30	2.3
Denmark	2,544	100.0	332	13.1	530	20.8	98	3.9
Estonia	1,725	100.0	253	14.7	339	19.7	94	5.4
Finland	2,456	100.0	366	14.9	403	16.4	101	4.1
France	2,345	100.0	383	16.3	545	23.2	131	5.6
Germany	2,032	100.0	379	18.7	406	20.0	66	3.2
Greece	2,042	100.0	410	20.1	434	21.3	116	5.7
Hungary	1,042	100.0	151	14.5	234	22.5	12	1.2
Ireland	1,706	100.0	266	15.6	388	22.7	65	3.8
Italy	2,423	100.0	413	17.0	554	22.9	181	7.5
Latvia	1,418	100.0	238	16.8	268	18.9	59	4.2
Lithuania	1,921	100.0	255	13.3	451	23.5	117	6.1
Luxembourg	2,919	100.0	494	16.9	628	21.5	226	7.7
Malta	1,546	100.0	262	16.9	279	18.0	106	6.9
Netherlands	2,092	100.0	425	20.3	403	19.3	62	3.0
Poland	1,103	100.0	145	13.1	216	19.6	25	2.3
Portugal	2,066	100.0	374	18.1	412	19.9	325	15.7
Romania	1,471	100.0	194	13.2	524	35.6	78	5.3
Slovakia	1,426	100.0	252	17.7	324	22.7	42	2.9
Slovenia	1,636	100.0	259	15.8	344	21.0	39	2.4
Spain	1,825	100.0	290	15.9	388	21.3	220	12.1
Sweden	2,488	100.0	366	14.7	432	17.4	138	5.5
United Kingdom	1,832	100.0	270	14.7	357	19.5	69	3.8

Source: own elaboration and calculations based on Eurostat data (prc_ppp_ind) – extracted
       on 29.06.18.

Table 4 presents the level and structure of expenditure on food and non-alcoholic beverages of households in the individual EU countries. The largest share in the structure of expenditure on food products is related to expenditure on meat as well as on bread and cereal products. For example, expenditure on meat in Romania accounts for over ⅓ of total food expenditure. In Belgium, the Czech Republic and Lithuania constitutes around ¼ of this expenditure. On the other hand, the inhabitants of the Netherlands and Greece spend the most on bread and cereal products. In both cases, expenditure on these goods exceeds 20%

Table 4

of households in the European Union in 2016 (nominal expenditure per inhabitant)

Milk, cheese and eggs		Oils and fats		Fruits. vegetables. potatoes		Other food		Non-alcoholic beverages	
euro	%	euro	%	euro	%	euro	%	euro	%
268	13.0	60	2.9	331	16.1	281	13.6	232	11.3
292	11.9	49	2.0	416	17.0	265	10.8	207	8.4
122	14.3	33	3.9	146	17.1	182	21.4	72	8.5
215	15.2	54	3.8	159	11.2	223	15.7	212	14.9
422	17.7	78	3.3	446	18.7	231	9.7	224	9.4
216	16.8	47	3.7	228	17.7	149	11.6	129	10.0
349	13.7	78	3.1	407	16.0	453	17.8	297	11.7
345	20.0	36	2.1	260	15.1	263	15.2	136	7.9
459	18.7	60	2.4	368	15.0	468	19.1	231	9.4
303	12.9	46	2.0	474	20.2	264	11.3	199	8.5
285	14.0	51	2.5	315	15.5	291	14.3	238	11.7
349	17.1	121	5.9	398	19.5	109	5.3	106	5.2
192	18.4	37	3.6	162	15.5	111	10.7	144	13.8
205	12.0	29	1.7	391	22.9	188	11.0	174	10.2
319	13.2	82	3.4	532	22.0	154	6.4	188	7.8
236	16.6	53	3.7	224	15.8	202	14.2	138	9.7
337	17.5	79	4.1	351	18.3	196	10.2	135	7.0
447	15.3	77	2.6	381	13.1	300	10.3	366	12.5
130	8.4	46	3.0	315	20.4	186	12.0	223	14.4
249	11.9	38	1.8	423	20.2	308	14.7	185	8.8
136	12.3	32	2.9	207	18.8	234	21.2	107	9.7
240	11.6	99	4.8	338	16.4	157	7.6	121	5.9
168	11.4	41	2.8	278	18.9	111	7.5	76	5.2
243	17.0	60	4.2	215	15.1	166	11.6	124	8.7
286	17.5	51	3.1	342	20.9	168	10.3	147	9.0
228	12.5	52	2.8	348	19.1	149	8.2	150	8.2
380	15.3	63	2.5	473	19.0	375	15.1	262	10.5
210	11.5	36	2.0	397	21.7	279	15.2	215	11.7

of the total expenditure on food and non-alcoholic beverages. The third category of food expenditure which is a burden on the household budget is expenditure on fruit, vegetables and potatoes. These products have the largest share in the structure of expenditures of the residents of Ireland (22.9%), Italy (22.0%) and the United Kingdom (21.7%). The fourth group of expenditure in the structure of consumption of food and non-alcoholic beverages is expenditure on milk, cheese and eggs. These products hold the largest share in the structure of food expenditure in Estonia (20.0%), Finland (18.7%) and Hungary (18.4%). Other groups of expenditure on food products such as expenditure on fish, non-alcoholic beverages or oils and fats have a relatively small share in the household budget for food consumption, and in the case of oils and fats it is even marginal (Tab. 4).

Analysing the structure of expenditures on food and non-alcoholic beverages of Polish households, attention should firstly be given to the lowest, in comparison to other EU countries, share of expenditure on bread and cereal products. In 2016, it was 13.1%. In addition, Polish households are also characterized by one of the lowest shares of fish expenditure amounting to 2.3%. Only Hungarian households have a lower share –1.2%. The expenditure on milk, cheese and eggs also has a relatively small share (12.3%). On the other hand, the expenditures on meat (19.6%) and on fruit, vegetables and potatoes (18.8%) have a relatively high share in the structure of food expenditure in Poland.

On the basis of the data presented in Table 4, it is difficult to indicate to what extent the EU countries are similar or to what extent they differ in the area of expenditure on food and non-alcoholic beverages. It is also impossible to determine relatively homogeneous groups of countries due to the apparent consumption of food. Such goals are served by methods of multidimensional analysis, including the Ward's cluster analysis carried out for the purposes of this paper, described in more detail in the methodological part.

The analysis covered 28 countries, the current EU Member States characterized by 8 diagnostic variables, describing the level of expenditure on food and non-alcoholic beverages in 2016 according to nominal investment per inhabitant in euros. These variables are: bread and cereals; meat; fish; milk, cheese and eggs; oils and fats; fruits, vegetables, potatoes; other food and non-alcoholic beverages. The values of variables have been compiled and presented in Table 4 on the basis of Eurostat data collected as part of COICOP/PPP.

As a result of the adopted method, a dendrogram was obtained, reflecting the hierarchical structure of the set of objects due to the decreasing similarity between them. The diagram of a binary tree shown in Figure 1 illustrates successive clusters of increasingly higher order clusters. The obtained hierarchy allows the determination of the relative position of clusters and objects contained in them, whereas the adopted cut-off point is used to separate relatively homogeneous groups of countries.

The dendrogram (Fig. 1) made it possible to distinguish seven clusters of countries with a similar structure of expenditure on food in the household sector[3]. In cluster I are Austria, Germany and the Netherlands. Cluster II includes: Belgium, France, Italy, Cyprus and Greece. Cluster III contains the Scandinavian countries Denmark, Sweden and Finland. Cluster IV encompasses Luxembourg.
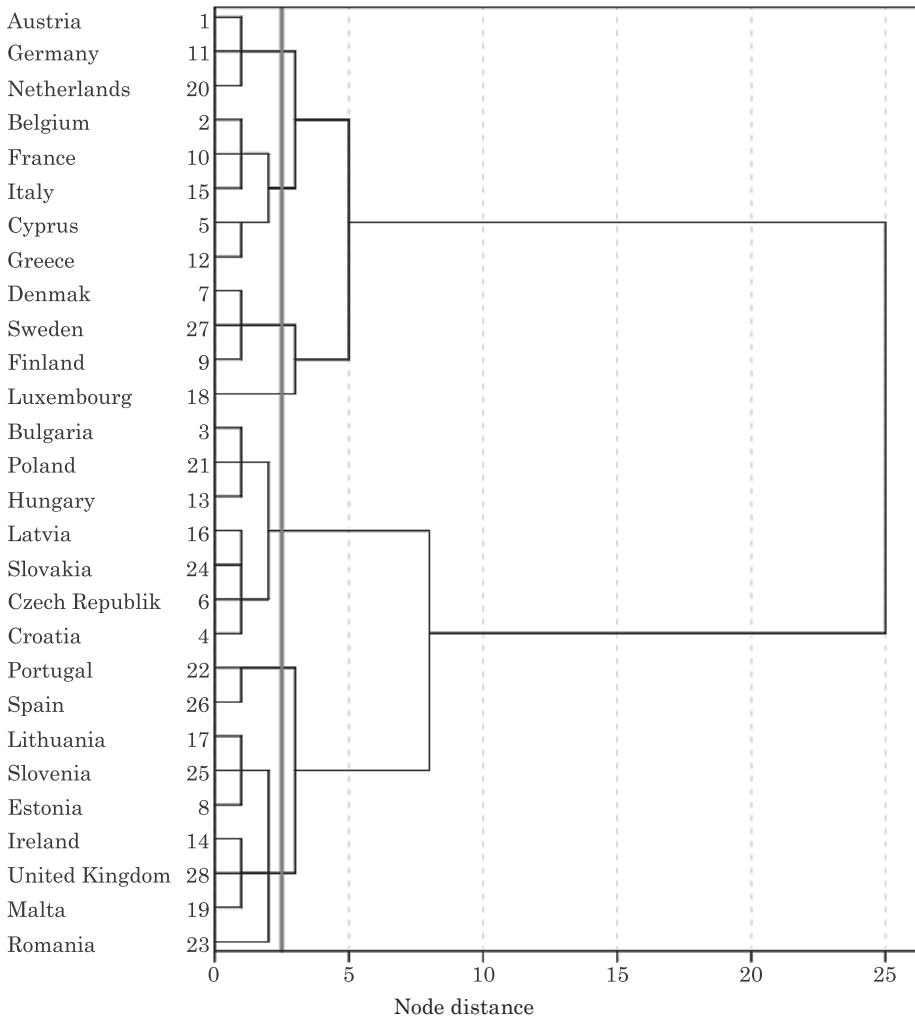

Fig. 1. Dendrogram using Ward's linkages for 28 EU countries
Source: own elaboration.

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[3] When choosing the optimal number of clusters, it turns out that a graph of the shape of agglomeration is the most helpful, as it shows the distance between the groups when they were clustered. A clear step increase in the level of the curve usually indicates a good choice as to the number of clusters. This is the value closest to the left of this step increase (Dobosz, 2001).

Poland was among the countries in cluster V, which also includes Bulgaria, Hungary, Latvia, Slovakia, the Czech Republic and Croatia. Cluster VI consists of Portugal and Spain. The last, cluster VII is represented by Lithuania, Slovenia, Estonia, Ireland, Great Britain, Malta and Romania (Maciejewski, 2018b, p. 25-28). The conducted cluster analysis showed that the similarities and differences in the level and structure of food expenditure, and thus in the size and structure of food consumption, are significantly correlated with cultural factors (as was similarly demonstrated during the analysis of individual expenditure groups). In addition, the proximity or geographical distance between individual countries is important in this respect. The first cluster consists of descendants of Germanic peoples. The second cluster – countries of the Mediterranean and Belgium, culturally and geographically close to France. As has already been said, cluster III is made up of Scandinavian countries. The countries of Central and Eastern Europe make up the fifth cluster, whereas the sixth, with geographical and cultural proximity, consists of the countries of the Iberian Peninsula. Only countries that are in the seventh cluster contradict the proposed thesis. However, the position of Luxembourg should not be surprising. Due to the small area and a relatively large group of workers from many other countries who work there in numerous European or financial institutions, it is difficult to recognize Luxembourg as a country similar to any group of countries.

In addition, analysing the matrix of squares of Euclidean distances of the countries according to their expenditure on food and non-alcoholic beverages, it can be concluded that Polish households are most similar to households from Bulgaria and Slovakia, while they differ most from households from Luxembourg and Italy.

Conclusions

The presented measures regarding food consumption in the household sector in Poland and the European Union indicate large disparities between individual countries. These disparities are especially visible between highly developed countries, the so-called 'Old Union' and its 'new' members from Central and Eastern Europe.

Despite the fact that the diversification clearly decreased in the period of 2006-2016, the less developed countries from Central and Eastern Europe are still far from realizing the service consumption model, allowing for better satisfaction of higher-ranking needs. The countries of this group also include Poland, whose food expenditure in 2016 fell to 17.1% of the total consumption expenditure, but the expenditure on services was at the lowest level among all the EU countries – except for Lithuania. The obtained results confirm the initially adopted hypothesis.

In turn, the results of cluster analysis, used for a deeper analysis of the collected data, lead to the conclusion that differences in expenditure on food products in the surveyed countries are largely determined by their economic situation, but the apparent impact of cultural and geographical conditions is also present (Kearney, 2010, p. 2798-2799; Maciejewski, 2013, p. 54; Necula & Mann, 2018, p. 942-943).

The research results and the conducted analyses presented in this paper can be an indication for the Community countries in the area of more effective cohesion policy-making. Continued support for the newly admitted EU members, especially from the former Eastern Bloc, will allow for a faster levelling of the standard of living and quality of life, and to reduce the distance in the civilizational advance between the 'old' and 'new' members of the Community.

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