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Food demand in the EU under conditions of economic slowdown

Scientific problem and analysis of recent researches and publications. The decline of global economic situation and weakening of export to third countries and internal demand, resulting from fiscal consolidation in 2011-2012 resulted in slowdown of economic activity in the EU Member States. During the recession, which is defined by Samuelsson as the period of recurrent decline in the main macroeconomic categories – domestic product, income and employment [P. Samuelson, W. Nordhaus, 2012] there is reduced current consumer spending, including mainly expenditure to meet the needs of higher order [Bohlen, Carlotti and Mihas, 2010]. Consumer behaviour is geared towards reducing the size of purchased goods and reducing the costs of purchases e.g. by finding cheaper substitutes [G. Desvaux, B. Regoaut, B. Labaye…, 2009]. Consumers try to make rational purchasing decisions, paying more attention to product price and promotions [Nie, Zhao, Yo, 2012].

Food is a fundamental right, which meets the basic physiological need of humans. For this reason, the demand for it is characterized by its own peculiarities. The biology of the human body imposes, on the one hand, a minimal level of food consumption, essential for survival (autonomous consumption) and, on the other hand, due to the limited capacity of food consumption by humans this is determined by some degree of saturation. Demand for food is not only based on the physiological aspect. Functioning of humans in the socio-cultural environment enriches food needs with additional elements related to imitation, the need for security, prestige and requirements [Grzelak, Gałązka, 2011].

Considerable importance of food consumption for country economies fully justifies an analysis of the impact of economic recession on the changes in demand for food in the countries of the European Union. The effects of the economic crisis in the sphere of consumption are varied depending on the degree of development of each country [Smith, Shachmurove, 2011]. According to Eurostat data, in 2011, consumption in the sector of households and non-profit institutions operating for the benefit of the household sector accounted for 58% of the GDP of the European Union and the expenditure on food and non-alcoholic beverages accounted for 12% of the total expenditure of households [Gerstberger, Yaneva, 2013]. These percentages varied in individual countries.

In the market of food products, consumer behaviour is shaped primarily by economic factors – income of consumers and food prices, which the economists perceive as one of the most important determinants shaping demand [Zalega, 2013].

The objective of the article. The purpose of this article is to present changes in the demand for food in the EU under the influence of changing macroeconomic conditions i.e. GDP, the situation on the labour market, household income and food prices. Using the method of cluster analysis by Ward, an attempt was made to group countries in which trends in these changes were similar.

Data and methods

In the development of the results, methods of descriptive and comparative analysis were used as well as the statistical method of multidimensional grouping, which is a multidimensional statistical analysis tool for analyzing a given phenomenon in terms of a few features at the same time. The aim of multidimensional grouping method is to divide a set of observations into homogeneous subsets, based on a set of characteristics that describe them [Poczta-Wajda, 2010].

The Ward's method stands out among other hierarchical methods in that for the purpose of estimating the distance between the clusters of objects it adopts variance analysis. It involves minimizing the sum of squares of deviations of two hypothetical clusters, which may be formed at each stage of the analysis. It does not require a priori formulation of hypotheses as to the number of clusters. The data used in the publication come from the database of Eurostat and cover the years 2010-2012. Statistical analysis was performed using the Statistica 8 software for data from 2011.[1]

Statement of the main results of the study. GDP in selected countries

According to UNSD data, in 2011 the total value of the global economy was USD 70201 billion. The economy of the European Union accounted for 25.1% of the world economy, i.e. 3.7% more than the economy of the United States.

In 2011, the economy of the European Union produced a total of goods and services with a value of 12 643 billion euros. The largest contribution to the GDP of the European Union was by Germany (20.5%), France (15.8%), United Kingdom (13.8%) and Italy (12.5%). The Polish economy was ranked 9th among the 27 EU countries, with a 2.9% share.

In 2010, after a period of recession in the years 2008-2009 caused by the global financial crisis rebuilding economic growth started in the European Union. In 2010, compared with the previous year in the EU-27, GDP increased on average by 2.1%, while it decreased by 4.3% the previous year.

In the first quarter of 2011, GDP growth accelerated to 2.4%, but in the subsequent quarters it declined, down to the level of 0.8% in the fourth quarter. The weakened economic growth was affected mainly the fiscal austerity policy, as well as the uncertain economic situation worldwide and unfavourable situation in financial markets and the labour market. In 2011 compared with 2010, economic growth in the EU-27 amounted to 1.6%. The highest growth was recorded by the Baltic States (Lithuania, Latvia and Estonia), which during 2008-2009 were leaders of GDP declines down to a dozen percentage points. With its 4.5% increase Poland was ranked just behind the Baltic countries. Declines in GDP were recorded in Greece, Portugal and Slovenia. Economic growth in the Baltic States was due mainly to the increase in private consumption, and in most other countries to the growth of net exports, especially in Slovakia, Ireland, Portugal and Cyprus.

Reduced activity in the global economy, resulting in the weakening of external demand and export, as well as the crisis in domestic demand, facing a large part of EU economies, slowed economic activity of the European Union in 2012[2]. According to estimates by the European Commission in 2012 in the EU-27 GDP decreased by 0.3% and by 0.4% in the euro zone. Negative GDP growth in the EU was mainly caused by unfavourable economic situation in: Greece, Portugal, Cyprus, Italy and Slovenia. Countries which reported the highest annual GDP growth included: Latvia, Lithuania and Estonia.

In 2011, in the EU-27 the average level of GDP per capita amounted to 25 100 euros and was about 600 euros higher than a year earlier. The countries with the highest GDP calculated based on purchasing power parity (PPS)[3] per capita were: Luxembourg, the Netherlands, Iceland and Austria. Poland was ranked 24th,

[1] due to absence of full data for 2012.

[2] According to the International Monetary Fund in the past year the world economy grew at a rate of 3.2% against 3.9% in 2011.

[3] Purchasing Power Standard (PPS) is a common artificial currency unit used by Eurostat to compare countries in such a way that the differences in price levels are eliminated. The values in the PPS are obtained by dividing the original value in national currency units by the corresponding PPP (indicators of price differences between countries).

with the level of GDP representing 64% of the EU average[4]. In 2012 Poland went up by one position in the above classification (66.3% of the average level in the EU), ahead of Hungary, Latvia, Bulgaria and Romania.

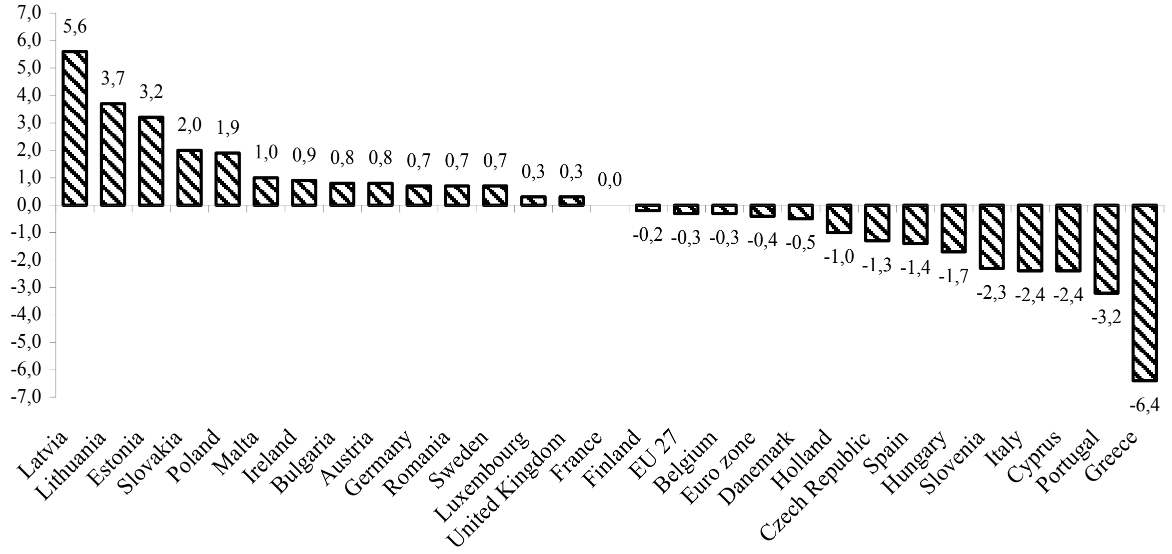

Figure 1. GDP in the EU countries in 2012 (%)

Source: Eurostat, own calculations.

Trends on the labour market

Economic recovery in 2010 was insufficient to achieve a clearer improvement in the situation on the labour markets in the EU countries. This is reflected, *inter alia*, in the low growth in the number of employed, maintained high level of unemployment and increased share of long-term unemployment.

In 2011, in the EU-27 the number of employed increased by 0.2%, after a decrease of 2.3% in 2009-2010[2]. The situation on the labour market in different countries was varied. In nine Member States of the Community, there was a decline in the number of employed (largest in Lithuania – by 8.4%, Latvia – by 6.9% and in Greece – by 6.7%) and an increase in the other ones. The number of unemployed in the EU in 2011 represented an annual average of 23.1 million people and was higher by 59 thousand compared with the previous year. Harmonised unemployment rate[3] remained at the same level as in 2010 and amounted to 9.7%. Its growth was reported in Greece, Spain, Cyprus, Slovenia, Portugal and Ireland, and its fall in Germany, Belgium, the Baltic States and Slovakia. The highest unemployment rate was observed in Spain (21.8%) and Greece (17.9%) as well as in Latvia - 16.5%.

The weakening of economic activity in the EU in 2012 negatively influenced the labour market. From mid-2012, unemployment was observed in most EU countries. According to Eurostat in 2012, the harmonised average annual unemployment rate stood at 10.5% compared to 9.7% in 2011. The largest increase in unemployment was reported in Greece, in Cyprus and in Portugal and Spain, and its fall - in Lithuania, Latvia and Estonia.

In 2012, the highest rate of unemployment in a year was seen in Spain, Greece, and Portugal. The lowest harmonised unemployment rate was reported in: Austria, Luxembourg and Holland.

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[4] In Poland, as in other countries which joined the European Union in 2004, there has been a process of aligning the level of GDP to the average level in the European Union. In 2009 this indicator measured in PPS per capita amounted to 60.5% and 48.9% in 2003.

[2] Aged 15-64.

[3] BAEL- Research on the economic activity of the population. According to this methodology, an unemployed person is deemed to be a person aged 15-74 years and meeting a total of three conditions:

- during the week surveyed they were not working,
- they actively looked for work (specific activities during the 4 weeks prior to the survey, including the week surveyed),
- they were willing to start work within two weeks after the survey.

The unemployed include persons who have found work, are waiting to start it (up to 3 months) and at the same time declare their willingness to take it up.

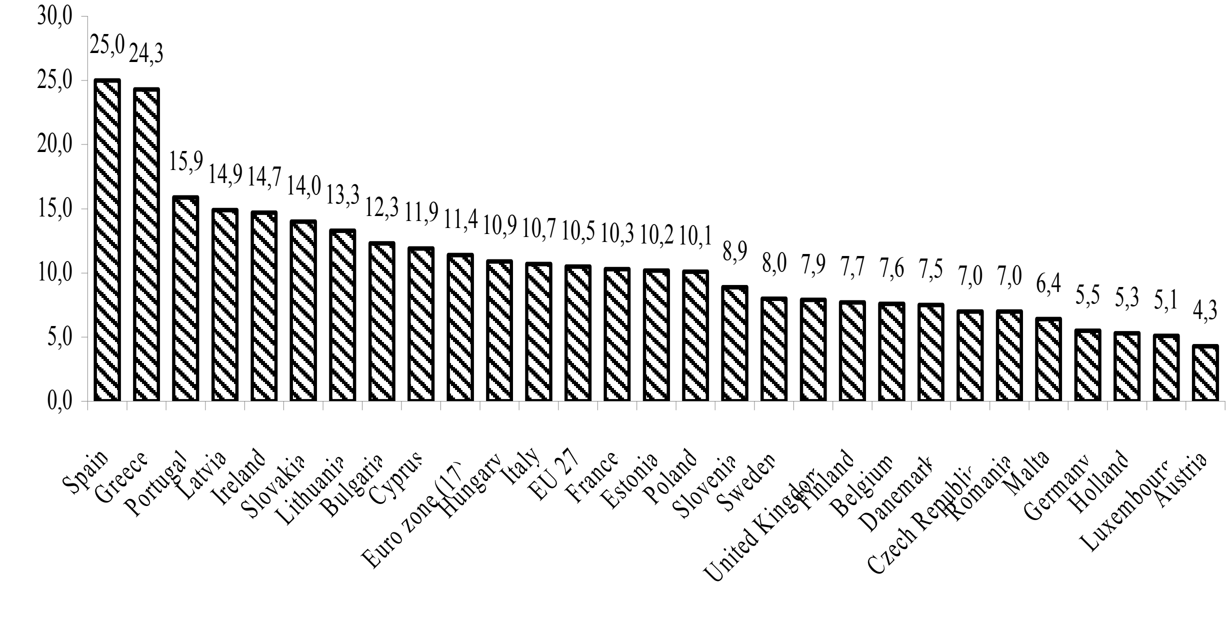

Figure 2. Harmonized Indices of Consumer Prices in Member States EU countries in 2012

Source: Eurostat, own calculations.

Income of the population in households (according to macroeconomic data)

In 2011 compared to 2010, in EU-27 real gross disposable income available to the household sector, calculated on the basis of data on income in national currencies adjusted by the rate of inflation (HICP) decreased by 0.7%, after an increase of 0.3% in the previous year. Income of the inhabitants of Sweden (3.3%), Hungary (3.0%), Latvia (2.3%) and Estonia (2.0%) increased most. In 2011 income fell most in Greece (by 9.9%), Cyprus (by 6.2%), Romania (by 4.8%), Portugal (by 4.6%), in Spain (by 3.5%) and in Ireland (by 3.4%).

Based on the Available Eurostat data, we may draw conclusions on changes that have taken place in real disposable income in the households sector per capita calculated according to purchasing power parity and expressed in a common notional currency (PPS)[1]. According to this methodology, in 2011 in the EU-27 growth in real disposable income in the households sector was at 1.9% compared with the previous year and was lower than in the year 2010 (2.3%). The income of the population in Latvia increased significantly (by 8%), Sweden (by 5%), Hungary (by 4.8 %), Estonia (by 4.4%), Germany (by 4.2%) and Poland (by 4.1%). In the first four countries revenue growth dynamics significantly deviated from 2010, when their decline was reported (Latvia - 1.8%, Estonia -2.2%), or only a slight increase (Sweden – by 0.7% and Hungary by 1.3%). In Germany and Poland in 2011, income increases were weaker than in 2010. In 2011, income of Greece inhabitants decreased (by 6.9%), Cyprus (by 4.4%), Romania (by 1.4%) Ireland (by 1.3%), Portugal (by 1.0%) and Spain (by 0.7%).

In 2011, the highest per capita income countries (by PPS) were: Luxembourg, Germany, Austria and France. The lowest income was achieved by the inhabitants of Bulgaria and Romania. Income of Poles was at 64% of the EU average.

According to Eurostat, in the years 2009-2011 real disposable income of the households sector grew in Poland at the fastest pace among the EU countries. As a result, their level became closer to the average in the Community (in 2009, income in Poland represented 60% of income in the EU-27).

EU food prices

In the European Union, in the years 2011-2012 increase in food prices was faster than in the previous two years and higher than the rate

[1] Real gross disposable income of households per capita in PPS is calculated as gross disposable income of households and non-profit institutions acting on behalf of households divided by purchasing power parity - PPP (calculated on the basis of the actual individual consumption of households), and the total population of the country concerned.

of inflation. According to Eurostat, in 2011, in the EU-27 prices food and non-alcoholic beverages per year increased by 3.4%, with inflation at 3.1%, and in 2012 grew by 3.0%, with an increase in overall consumer prices by 2.6%[2]. In 2011, the food became most expensive in the new EU member countries (in Estonia by 9.4%, in Latvia by 8.4%, in Lithuania by 8.2%, and in Hungary by 7.3%, Bulgaria by 6.5% and Romania by 6.1%).

In 2012, the highest increase in the prices of food and non-alcoholic beverages (per year) was reported in the Czech Republic, Hungary, Malta, Finland and Slovakia and Denmark. The countries with the lowest growth dynamics in food prices were: Ireland, Sweden and Greece as well as Spain, Holland, Latvia and Romania. In 2012, the average annual increase in food prices was 4.2% (HICP) and, as in the previous year, was higher than the average in the EU-27.

In December 2012, compared with December 2011, in the EU-27 prices of food and non-alcoholic beverages increased by 3.4%, with a total growth of prices of consumer goods and services by 2.3%.

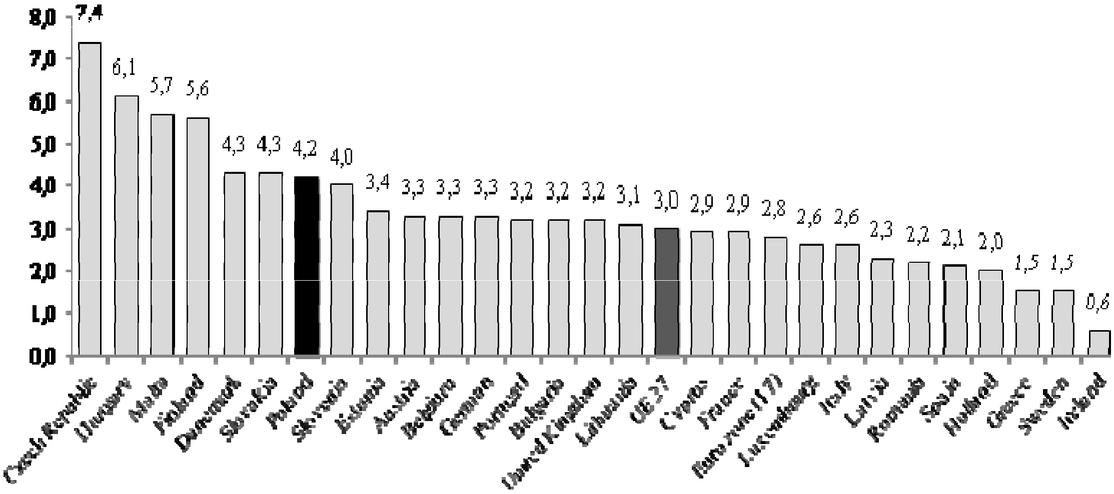

Figure 3. Annual average increase in the prices of food and non-alcoholic beverages in the EU countries in 2012 (%)

Source: Eurostat, own calculations.

Table 1. Macroeconomic indicators in Member States (%)

	PKB		Real income of households		Retail sale of food		Prices of food and non-alcoholic beverages		BAEL unemployment rate		Spending on food	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
EU 27	2.1	1.6	0.4	-0.7	-0.2	-1.1	1.1	3.4	9.7	9.7	2.0	-0.6
Euro zone (17)	2.1	1.5	-0.6	-0.6	0.3	-1.0	0.4	2.5	10.1	10.2	1.3	-0.1
Belgium	2.4	1.8	-1.4	-1.1	0.0	-0.2	2.1	2.4	8.4	7.2	1.9	-1.5
Bulgaria	0.4	1.8	-1.6	0.0	1.9	2.6	-0.5	6.5	10.3	11.4	8.0	:
Czech Rep.	2.5	1.9	4.8	0.0	0.8	-1.1	1.4	5.2	7.4	6.8	1.1	0.2
Denmark	1.6	1.1	2.2	0.2	-1.5	-1.1	0.4	4.0	7.6	7.7	1.5	-1.1
Germany	4.2	3.0	1.7	0.8	-0.5	0.1	1.4	2.9	7.2	6.0	1.6	1.1
Estonia	3.3	8.3	-6.3	2.0	-2.4	1.7	2.9	9.4	17.3	12.8	-6.5	-1.9
Ireland	-0.8	1.4	-3.4	-3.4	1.0	-0.5	-4.6	1.2	14.1	14.9	-1.9	3.7
Greece	-4.9	-7.1	-11.4	-9.9	-5.6	-6.0	0.1	3.1	12.7	17.9	-0.2	-3.6
Spain	-0.3	0.4	-4.8	-3.5	-1.3	-3.9	-0.4	1.7	20.2	21.8	3.0	0.1

[2] Harmonised indices of consumer prices (HICP) are calculated according to a harmonised methodology for the European Union by the Member States.

Extension Table 1

France	1.7	2.0	0.3	0.3	2.1	0.4	0.8	2.0	9.4	9.3	1.2	0.8
Italy	1.7	0.4	-0.8	-0.6	0.0	-2.7	0.2	2.6	8.5	8.5	0.7	-1.3
Cyprus	1.3	0.5	3.4	-6.2	6.3	5.2	0.8	4.5	6.5	8.1	4.2	1.9
Latvia	-0.9	5.5	-5.6	2.6	-5.2	1.3	-0.3	8.4	19.0	16.5	1.7	5.9
Lithuania	1.5	5.9	-0.5	-2.1	-8.4	0.9	-0.4	8.2	18.0	15.5	-6.5	1.2
Luxembourg	2.9	1.7	0.3	-1.6	0.9	3.1	0.9	2.7	4.4	4.9	2.0	2.4
Hungary	1.3	1.6	-1.1	1.5	-2.0	0.3	2.8	7.3	11.2	11.0	-1.4	-1.1
Malta	3.2	1.8			6.3	3.0	1.1	4.9	7.0	6.6	1.4	3.1
Holland	1.6	1.0	0.4	-0.7	1.0	-0.6	-0.1	2.2	4.5	4.4	1.6	-0.1
Austria	2.1	2.7	-0.4	-0.9	3.0	-0.3	0.4	4.4	4.5	4.2	1.1	-1.0
Poland	**3.9**	**4.5**	**10.4**	**-2.0**	**-1.6**	**-5.6**	**2.6**	**5.1**	**9.7**	**9.8**	**0.1**	**-1.0**
Portugal	1.9	-1.6	1.5	-4.7	2.5	-2.7	-0.2	2.1	11.4	13.4	:	:
Romania	-1.1	2.2	-4.7	-5.4	-9.4	-6.9	2.3	6.1	7.6	7.7	0.3	:
Slovenia	1.2	0.6	-0.9	-0.7	-1.7	-3.0	0.9	4.4	7.4	8.3	2.3	0.2
Slovakia	4.4	3.2	3.9	-1.6	1.8	-2.2	1.7	5.9	14.4	13.6	-1.9	-2.4
Finland	3.3	2.8	2.5	0.3	4.3	1.7	-3.6	5.9	8.5	7.9	4.3	-0.4
Sweden	6.6	3.7	12.7	9.2	0.3	0.1	1.3	1.3	8.8	8.0	0.0	2.2
United Kingdom	1.8	1.0	4.7	-2.0	-1.3	-0.5	3.4	5.5	7.9	8.2	-0.2	-1.7

Source: Eurostat, own calculations.

Expenditure on food in the household sector in the European Union

Slower pace of GDP growth, deterioration of the situation on the labour market, low income growth in the population and real increase in food prices– these are the main factors that led to the decline in demand for food in the European Union in the years 2011-2012. In 2011, in the EU-27, consumption of food and non-alcoholic beverages measured by real expenditure value in the sector of households after a slight recovery in 2010, declined by 0.6% - to the level recorded in 2008. Changes in consumption in individual countries were very varied. The biggest fall was recorded in Greece (by 3.6%), Slovakia (by 2.4%), Estonia (by 1.9%) and Great Britain (by 1.8%). In Austria, Belgium, Denmark, Poland, Hungary and Italy food consumption decreased by 1.0 - 1.5 percent. In some countries, it showed an upward trend, including *inter alia* in Latvia (an increase of 5.9%) and in Ireland (3.7%), Malta (3.1%), Luxembourg (2.4%) and Sweden (2.2%).

In 2011, in the EU-27 the average household expenditure on food and non-alcoholic beverages amounted to 1,800 euros per capita, which accounted for 12.9% of total expenditure. This was the same as in the previous year. In 2011, countries with the biggest share in the consumption structure were: Romania (27.5%), Lithuania (25.4%), Latvia (19.9%), Estonia (19.8%) and Poland (18.9%). The smallest percentage of total expenditure was spent on food by inhabitants of Luxembourg (8.5%), the United Kingdom (9.1%) and Austria (9.9%).

Retail sale of food

Decline in demand for food in the European Union is confirmed in retail sales data. According to Eurostat, in 2011, the retail sale of food, beverages and tobacco, at constant prices, in the EU-27 decreased by 1.1% compared with the previous year[1]. The decline was much larger than total sales (-0.2%). Sales of food, beverages and tobacco significantly decreased in Romania (by 6.9%), Greece (by 6%), Poland (by 5.6%), in Spain (by 3.9%), Slovenia (by 3.0%) and in Portugal and Italy (2.7%).

It is estimated that in 2012 in the EU-27, the pace of decline in retail sales of food, beverages and tobacco was similar to that recorded in 2011 and amounted to 0.9%, and in the euro zone it increased by 1.3% from 1.0% in 2011.

Classification of EU countries based on macroeconomic situation and the demand for food in 2011

[1] Data according to the Eurostat methodology are adjusted for the number of working days. They also include the smallest companies with up to 10 employees, i.e. mainly small shops.

Cluster analysis takes into account the impact of the following indicators: GDP, real income, and unemployment rate, the price of food and non-alcoholic beverages and retail food sales. On the basis of the above indicators from 2011 EU a grouping process for UE countries was conducted using the Ward's method[2]. When analyzing the dendrogram, 5 clusters were identified. The first group is formed by Greece, Spain, Portugal, Romania and Poland, which is characterized by a negative GDP growth rate in 2011, the largest decline in real income of household sector and the largest increase in the unemployment rate (1.8%). Consequently, the biggest decline was noted in it in terms of the demand for food measured by retail sales of food, which in 2011 fell by an average of 5% (fig. 4).

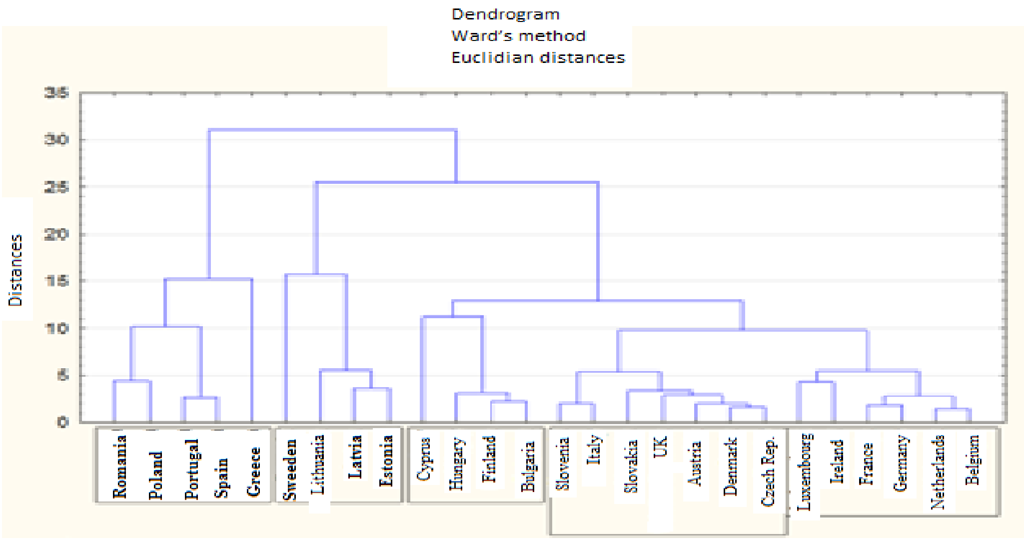

Figure 4. A Dendrogram of Euclidean distances made using Ward's method

Source: Eurostat, own calculations.

Another group is formed by Baltic states - Estonia, Lithuania, Latvia and Sweden, which saw the largest GDP growth compared with other groups in 2011 — by an average of 5.9%, an increase in real disposable income of the population – by an average of 2.9% and a decrease of unemployment rate – by an average of 2.6% The consequence of these phenomena was an increase in real retail food sales – by an average of 1.0%. In this group the highest increase in the price of food and non-alcoholic beverages was also observed - by an average of 6.8%.

The smallest changes in retail food sales were observed in the group of countries with mature economies and a high level of economic development - Luxembourg, France, Germany, Ireland, the Netherlands and Belgium (by an average of 0.4%).

Table 2. Average values of macroeconomic indicators in 2011- for groups of UE countries (%)

Details	GDP	Real income of the population	Change in unemployment rate (in percentage points))	Prices of food and non-alcoholic beverages	Retail sale of food
Greece, Spain, Romania, Portugal, **Poland**	-0.3	-5.1	1.8	3.6	-5.0
Estonia, Lithuania, Latvia, Sweden	5.9	2.9	-2.6	6.8	1.0
Bulgaria, Cyprus, Finland, Hungary	1.7	-1.1	0.5	6.1	2.5
Slovakia, Slovenia, Italy, United Kingdom, Austria, Denmark, the Czech Republic	1.6	-0.8	-0.1	4.6	-1.6
Luxembourg, Ireland, France, Germany, Holland, Belgium	1.8	-1.0	-0.2	2.2	0.4

Source: own calculations.

Conclusions. The economic downturn in the years 2011-2012, which was the next wave of the crisis started in 2008, led to a negative demand shock, which as a consequence caused GDP declines in production volume in many European economies. These phenomena combined with negative changes in the labour market (employment decline, growth of unemployment) led to the deterioration of the income situation of the population in the EU countries. Increases in the price of food and alcoholic beverages which were higher than inflation resulted in real increases in the prices of food. In this situation, consumers had to adjust their shopping behaviour to the new price structure and smaller income, mainly by reducing the demand for food. This was confirmed by a drop in real expenditure of the household sector on these items and a decline in retail sales of food. The attempt to group countries demonstrated that in 2011, Poland along with Greece, Spain, Portugal and Romania belonged to the group of countries with the highest real decline of income in households and consequently the strongest reductions in the demand for food.

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