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IMPACT OF NEW MEMBER STATES ACCESSION ON FOOD SAFETY AND OBESITY IN THE EUROPEAN UNION

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ABSTRACT

The objective of this paper is to present food safety in the EU and obesity among inhabitants of the Member States countries. The Global Food Security Index (GFSI) was analyzed for the period from 2012 till 2016 using descriptive, tabular and graphical methods. UN-FAO data was the source of information on the GFSI. The concept of the GFSI is described and then used to explain changes in national food security and obesity over time. The GFSI index in 2016 was the highest in Ireland (84.3) and Netherlands (82.6). The lowest GFSI Index in 2016 was found in Bulgaria (60.6), Romania (65.6), and Slovakia (67.7). The results indicate that the largest increase in the GFSI during this period were observed in the Great Britain (+3.1), Ireland (+2.4), and Germany (+1.4). The authors also analysed obesity resulting from excessive consumption of food in developing and developed countries. The research shows that the highest obesity rates are in the Great Britain (28.1%), the Czech Republic (26.8%), Slovakia (25.7%), and Ireland (25.6%).

Key words: food safety, obesity, EU countries

INTRODUCTION

Recent developments in the food system in Europe have focused primarily on food quality attributes. Increasing wealth and consumption awareness by customers have led to food purchase decisions based more on quality rather than quantity criteria. Attention has focused on how food quality fulfills consumer demand and the impacts the quality of societal well-being. Food quality attributes have a large impact on the choice of production and technology processes at the enterprise level.

Cooperation between farmers, processors, and traders is very important because a problem in one sector of the food system (for example, poor production at the farm level) can disrupt the entire supply chain. At the farm level, food quality is determined by the physical and chemical characteristics of individual food items. Overall, food quality requires recognition of consumer needs and preferences at every stage of the food chain [Cyrek et al. 2016]. Henson and Caswell [1999] suggest that development of food policy should include customers, food manufacturers, food retailers, farmers, government, and taxpayers. Policymakers need to balance the alternative demands of these groups, including the need for trade policy, food security, and food safety and nutrition labeling regulations. Another stimulus has been the

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move to reduce food loss and waste. It is estimated that 89 million t of food is wasted in the EU annually. Approximately 9 million t of food is destroyed each year in Poland, which is fifth in the EU behind the Great Britain, Germany, France, and the Netherlands [FAO 2011].

The phenomenon of food waste is dominated by consumption trends and changing consumer behavior. These changes have also contributed to the generation of excessive production waste and food losses. Irrational consumption leads to negative social consequences, including the development of such diseases as diabetes, heart disease, allergies, obesity, and depression. Growing criticism of unbridled consumption has resulted an intensive campaign of education in favor of healthier lifestyles, supported by the establishment of various laws (primarily by the World Health Organization and the European Union). A significant role is also played by environmental and ethical arguments. Mass production of consumer goods and their constant improvement, coupled with intensified marketing, further diminishes market transparency. Consumers are becoming more and more lost in the excess of goods and their prices. The information asymmetry in the market increases in favor of the seller [Mróz 2013].

Rapid technological and organizational progress in recent decades has significantly increased technical and economic efficiency and the effectiveness of production and distribution processes. These results led to the reduction of the complexity and the energy consumption of food production. More goods are produced not only more quickly, but also more cheaply. This phenomenon is undoubtedly economically and socially beneficial. Powerful arguments can also be made on the side of rational consumption of non-renewable natural resources. As a consequence, the growing problem of food safety in the context of health has appeared. The problem of food safety is also impacted by national policies relating to the sustainability of food production and consumption. Bearing in mind the changes over time in the economics of food production and manufacture, and in food safety and security, this paper investigates the role that the accession of new members to the EU since 2004 has had on the GFSI.

LITERATURE REVIEW

The development of the food sector is often thought to be an important step in achieving food self-sufficiency for a country. The concept of food self-sufficiency is defined by the FAO [1999 as a country's ability to "satisfy its food needs from its own domestic production". However, Clapp [2017] claims that "most net food exporting countries are not self-sufficient". Self--sufficiency is often "focused on the supply, or availability component of food security, and is concerned with ensuring that the country has the capacity to produce food in sufficient quantities to meet its domestic needs". The concept "does not distinguish whether that food is imported from abroad or grown domestically" [Clapp 2014].

Another issue for the food sector is the potential public health problem resulting from food borne illnesses. There are at least two approaches to studying the impacts of food safety scares. The first evaluates the impact of food safety on market demand or price. Pozo and Schroeder [2016], for example, measured the cost of meat and poultry recalls and point out that they are a major concern that can cause significant economic loses for food production, processing, and marketing firms. Recalls can also trigger a decline in consumer confidence, thereby reducing future product demand. The second approach tests if hypothetical food safety standards have an impact on consumer behavior. Nowadays consumers pay much more attention to how their food is produced, including the fast growing organic sector that uses practices with reduced environmental impacts [Li et al. 2017].

Another important problem is food security which is linked with various factors such as climate change, grazer performance, technology, management, and irrigation [Yang and Nie 2016]. Food security is a difficult balancing act in the context of a sustainable agro-food system. This problem is exacerbated by climate change and greenhouse gas emissions and the preservation of key resources like soil and water [Mylon et al. 2018]. Environmental degradation is both directly and indirectly linked to the overall size of consumption. Increased production has also resulted in increased demand for natural resources and accumulation of additional post-consumer waste streams.

A survey conducted by Firlej [2010] proved that domestic enterprises consider the impact of cooperation and competition with other developed countries. Among other factors influencing the competitiveness of food industry sector are the environment, technical infrastructure, and various human capital characteristics. Market conditions directly affect the profitability of food enterprises. The food industry cannot function alone without other elements of the marketing chain including customers and consumption behavior. An important factor is dedicated to global turnover including export of food products [Stefko 2013].

RESEARCH METHODS

The primary objectives of this research are to: (1) evaluate changes in the food security index; and (2) link these results to the number of obese people in the EU. The Global Food Security Index (GFSI) developed by UN-FAO is used to evaluate food security in the EU. The GFSI includes the following criteria: price affordability, food availability, food quality and safety, food consumption as a share of household expenditure, GDP per capita, food loss, and diet diversification. Changes in the overall GFSI index during the period from 2012–2016 for EU countries are presented and changes in components of GFSI are investigated further to determine the causes of fluctuation in the index.

FOOD SAFETY AND SECURITY IN EU COUNTRIES

Food safety is a critical issue both for consumers and the food industry. The UN-FAO's definition of food safety is "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" [UN-FAO 1996]. Critical food safety issues can arise at any time during the preparation, cooking, buying, and consumption process. An important tool to protect consumer is the Hazard Analysis Critical Control Points (HACCP) program, a systematic approach to food safety that was started in the early 1960s and is now codified in the ISO 22000 family of food safety management standards. As Schillhorn van Venn [2005] points out, HACCP helps in the introduction of food safety management protocols and it can be based on local skills and concepts rather than the introduction a western model. Understanding the process of critical control points is complicated because cross border supply chains are organized in different trade environments, each with their own regulations, logistic networks, and technologies. Good Agricultural Practices (GAP) and Good Handling Practices (GHP) programs also help maintain safe food by using voluntary audits to make sure that fruits and vegetables are grown, harvested, shipped, and stored to minimize the risk of contamination [Rahmat et al. 2016].

Food safety considerations are particularly important when considering market access requirements and exports. High income countries comply with food safety standards because they support food security goals [Unnevehr 2015]. Today's consumers demand high quality products in the right place and at the proper time. The demand for healthy food is growing with income levels, urbanization, and consumer awareness. Consumers are concerned because the incremental exposure to illness caused by exposure to food contamination every day. The WHO [2014] reports that more than 90% of human exposure is due to food, particularly meat and dairy products, fish, and shellfish. Demand for quality food is increasing and is evidenced by the growth in health food and organic food markets [Winter 2003]. Supporting food safety requires investment at various levels, including human resources, agricultural infrastructure, water resources, and natural resources with an aim towards decreasing poverty in rural areas [Rosegrant and Cline 2003].

Another important issue for food safety is packaging which is continuously evolving in response to the growing challenges from modern society. Major challenges include legislation, global markets, longer shelf life, convenience, safer and healthier food, and reduction of food waste [Realini and Marcos 2014]. Packaging is designed to protect products from the external environment, inform the consumer, and accommodate consumer life style choices. Packaging is an important food quality control designed to better protect the consumer against food-borne illness and to maximize the efficiency of food industries [Ghaani et al. 2016].

Food packaging is undergoing innovations and must meet the increasing requirements of target consumers [Vanderroost et al. 2014].

Although global food production is currently sufficient to feed people, many people still suffer from hunger. This is because the available food is not well distributed even though agricultural yields are increasing. Increasing yields can also mean disruption of natural processes because of the use of artificial fertilizers and pesticides. That is why agriculture intensification that is designed to feed the most people and issues relating to biodiversity represent major future challenges [Tscharntke et al. 2012]. About 1.2 billion people in the developing world are poor, spending a dollar or less per day on food and other basic needs. Most poor people live in the rural areas and directly depend on subsistence agriculture to survive. According to Pinstrup-Andersen and Pandya-Lorch [2001] about 800 million people (one-sixth of the developing world's population) do not have access to sufficient food to lead healthy, productive lives. To help fight hunger, local food programs appear whose aim is to improve the nutrition of local society and local environments, developing greater sense of community ownership, and supporting sustainable development. These programs are based on local foods, community enterprises, health and education, and economic activity [Kirwan et al. 2013].

The development of national food industries are linked with food security. The GFSI has been published since 2012 and uses a set of indices of food affordability, availability, quality, safety, food consumption as a share of household expenditures, per capita GDP, food loss, and diet diversification to measure food security across 113 countries. Changes in the GFSI for EU countries during the period 2012-2016 are presented in Table 1. In the EU the highest values for the global food security index in 2016 were in Ireland (84.3), the Netherlands (82.6), and Germany and France (82.5). The lowest values for the GFSI were observed in Bulgaria (60.6), Romania (65.6), and Slovakia (67.7). The largest increase in the GFSI during the 2012–2016 period was observed in the Great Britain (+3.1%), Ireland (+2.2), and Germany (+1.3). The largest decrease in the GFSI during these years was in Greece (–3.2%), Hungary (–2.6%), and Denmark (–1.1%).

Changes in the various components of the Global Food Security Index for members of the EU during the period from 2012–2016 are shown in Table 2. Price affordability in 2016 was highest in Ireland (82.4), Austria (81.9), and Germany (81.7). The price affordability improved most during this period in Bulgaria (4.0%), Poland (1.1%), and Romania (0.5%). Food price affordability did not change in Austria and Denmark. Food affordability decreased in the period from 2012–2016 in Greece (–8.5%), Portugal (–0.9%), and Finland (–0.6%). The price affordability was analyzed by Kraciuk [2017]. He found that decreasing price affordability in the years 2012–2016 indicated problems on demand side.

The food availability increased the most during this period in the United Kingdom (9.4%), Ireland (6.4%), and Portugal (4.3%). The highest levels of food availability in 2016 were seen in Ireland (85.4), Germany (83.8), and France (82.7). Food availability decreased the most in Hungary (–7.3%), Bulgaria (–3.6%), and France (–2.5%). The highest food quality and safety in 2016 were observed in Portugal (89.7), France (88.7), and the Netherlands (86.1). The countries with the largest improvement in food quality and safety were Germany (1.9%), Finland (1.7%), and Slovakia (0.9%). The countries who experienced the largest decreases in food quality and safety were Hungary (–2.9%), Romania (–2.0%), and Denmark (–1.8%).

The food consumption as a share of household expenditure increased most in Portugal (13.9%), the Czech Republic (11.3%) and Hungary (9.6%). It did not change in Belgium, Greece, or Italy. The highest food consumption as a share of household expenditure in 2016 was observed in Romania (37.5%), Bulgaria (18.7%), Poland and Portugal (18.0%). The food consumption as a share of household expenditure decreased most in Poland (–6.7%), the United Kingdom (–2.3%), and Denmark (–0.9%) and increased the most in Portugal (13.9%), the Czech Republic (11.3%), and Hungary (9.6%). Per capita GDP increased most during the period 2012-2016 in Slovakia and Romania (17%) and Ireland (15.3%). It decreased the most in Greece (–3.2%). The highest GDP per capita at PPP (USD) in 2016 was in Ireland (USD 51,800), the Netherlands (USD 49,190), and Austria (USD 47,170).

Table 1. Global food security index in EU member countries in 2012–2016

Country	Global ranking	2012	2013	2014	2015	2016	Five-year change (%)
		points					
Austria	16	78.9	79.2	79.8	78.8	79.3	+0.4
Belgium	21	77.9	77.6	76.9	76.5	77.4	–0.5
Bulgaria	50	60.5	60.3	59.3	59.5	60.6	+0.1
Cyprus	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Croatia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Czech Republic	25	73.0	74.0	73.3	72.6	73.9	+0.9
Denmark	14	81.1	80.5	80.7	79.2	80.0	–1.0
Estonia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Finland	17	79.6	79.4	78.4	77.2	78.9	–0.7
France	6	83.5	83.0	81.5	81.6	82.5	–1.0
Germany	6	81.2	80.9	81.5	81.6	82.5	+1.4
Greece	31	74.7	71.5	72.3	70.7	71.5	–3.3
Hungary	34	71.9	71.6	69.6	68.5	69.3	–2.6
Ireland	2	82.1	81.4	81.8	82.3	84.3	+1.5
Italy	22	75.3	74.7	75.8	75.0	75.9	+0.6
Latvia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lithuania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	4	82.9	82.4	82.8	82.2	82.6	–0.2
Poland	29	72.6	71.6	71.7	72.1	72.4	–0.2
Portugal	14	78.8	78.4	79.1	78.7	80.0	+1.2
Romania	42	65.2	65.2	65.8	64.8	65.6	+0.3
Slovakia	40	68.1	67.6	67.0	67.0	67.7	–0.4
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	19	78.3	77.7	78.4	76.9	77.7	–0.6
Sweden	10	80.7	80.1	80.3	80.0	81.3	+0.6
United Kingdom	8	78.8	79.0	79.4	79.3	81.9	+3.1

Source: Global Food Security Index. Reports of 2012, 2013, 2014, 2015 and 2016.

Food loss is one of the biggest challenges to food security worldwide. The United Nations announced a strategy under the Sustainable Development Goals (SDG) agenda to reduce food waste reduction by 2030 [Sheahan and Barrett 2017]. During the period from 2012 to 2016, the countries that reduced food loss the most were Slovakia, the United Kingdom, and Denmark, while Italy, Sweden, and the Netherlands experienced the largest increases in food waste. However, the highest percentage of food loss in 2016 was

Table 2. Changes in the Global Food Security Index components in EU countries in the years 2012–2016 (%)

Country	Price affordability	Food availability	Food quality and safety	Food consumption as a share of household expenditure	GDP per capita	Food loss	Diet diversification
Austria	0.0	0.93	0.49	1.0	7.81	10.0	-1.5
Belgium	–0.2	–1.49	0.0	0.0	5.91	13.4	–3.9
Bulgaria	4.04	–3.6	–0.34	2.7	12.7	–8.33	0.0
Czech Republic	–0.4	3.86	–0.57	11.3	12.9	–8.33	1.4
Denmark	0.0	–2.26	–1.77	–0.9	7.02	30.0	–1.4
Finland	–0.6	–1.95	1.65	5.8	0.21	–5.0	0.0
France	–0.3	–2.48	0.0	3.9	6.5	–6.5	–1.4
Germany	0.1	3.20	1.88	1.0	9.3	0.0	1.5
Greece	–8.9	–1.31	–1.03	0.0	–3.2	–6.7	2.8
Hungary	–0.26	–7.3	–2.89	9.6	14.4	0.0	0.0
Ireland	0.2	6.4	–1.15	8.2	15.3	–16.1	1.4
Italy	–0.4	2.76	–0.72	0.0	1.87	–48.8	–5.4
Netherlands	–1.1	–0.24	–0.23	4.5	5.84	–14.8	–1.5
Poland	1.07	–1.72	0.54	–6.7	15.5	27.3	3.0
Portugal	–0.9	4.31	0.45	13.9	7.9	2.7	1.7
Romania	0.45	1.5	–1.95	0.0	17.4	0.0	2.9
Slovakia	0.27	–2.19	0.75	2.3	17.4	42.1	–1.4
Spain	–0.3	–1.21	–0.58	4.0	7.36	0.0	1.6
Sweden	0.1	1.78	0.35	1.6	8.0	–20.7	–1.8
UK	0.4	9.40	–1.22	–2.3	11.9	33.3	–6.6

Source: Own study based on Global Food Security Index 2016.

found in Bulgaria (9.2%), Greece (4.6%), and Poland (3.8%). The highest diet diversification in 2016 has been found in 2016 in Spain (75), Austria (74), and Holland (73). The largest increases in diet diversification over the 2012–2016 period occurred in Poland (3.0%), Romania (2.9%), and Greece (2.8%).

CONCLUSIONS AND IMPLICATIONS FOR POLICY

The GFSI did not change much for the overall EU during the period from 2012–2016. Price affordability improved in many countries, improving during 2012–2016 in Bulgaria (4.0%), Poland (1.1%), and Romania (0.5%). Moreover, food availability increased the most during this period in the United Kingdom (9.4%), Ireland (6.4%), and Portugal (4.3%). In addition, the food consumption as a share of household expenditure increased most during this period in Portugal (13.9%), the Czech Republic (11.3%), and Hungary (9.6%).

One of the problems of developed countries in the EU is obesity of their inhabitants. Countries with

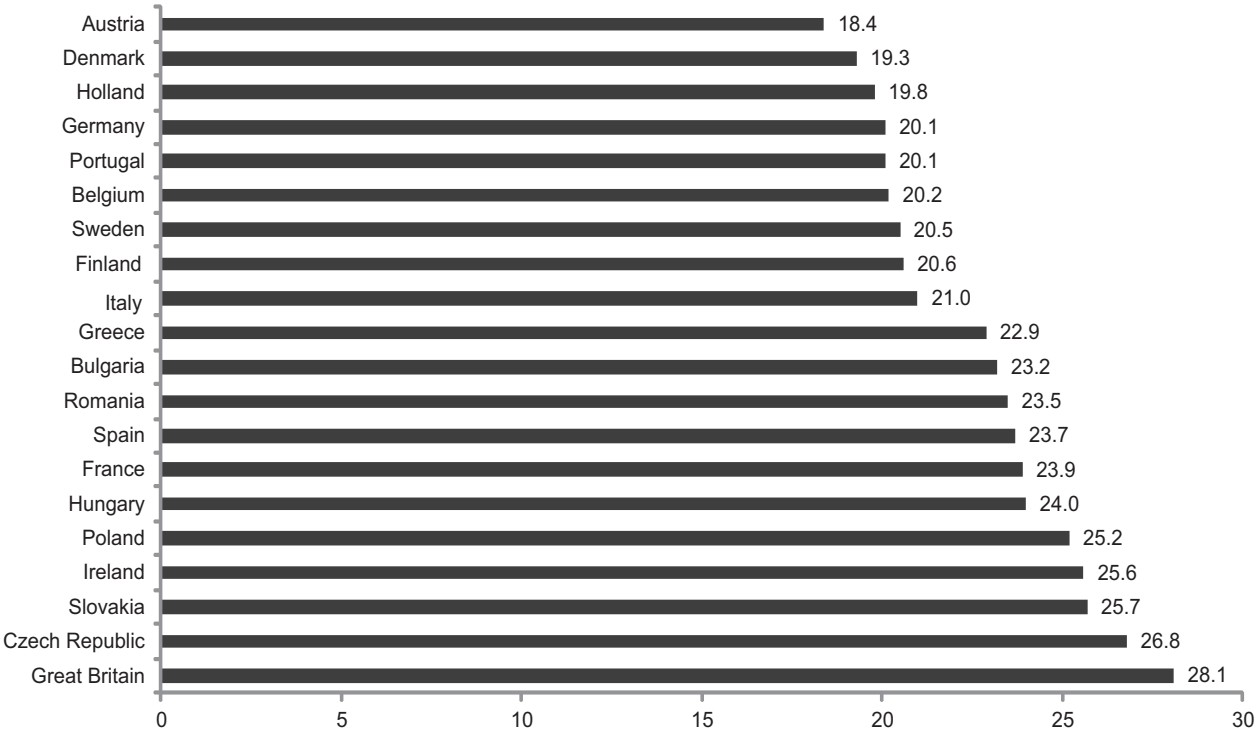

Fig. Obesity in people over 20 years old in the European Union in 2016 (%)
Source: Own study based on Global Food Security Index 2016.

the highest obesity rates in 2016 are the Great Britain (28.1%), the Czech Republic (26.8%), Slovakia (25.7%), and Ireland (25.6%). The lowest obesity rates are in Austria (18.4%), Denmark (19.3%) and the Netherlands (19.8%) – the figure.

Food safety in the new member states of EU-12 which have joined the EU since 2004 is lower compared to member states of the EU-15. This will continue to be a problem for income redistribution programs that support proper food safety. The quality of products should be improved. This can be achieved by increasing international awareness about food safety and quality, especially for niche products. This requires investments in quarantine infrastructure and laboratories to monitor the safety of food products. Adopting ISO, HACCAP, and GHP and in conjunction with GAP for pest management, manure handling, and phytosanitation would revolutionize food quality system and food safety management systems worldwide [Rahmat et al. 2016]. Food security requires investment in research and water and transport infrastructure. Innovations in agricultural production practices and crop breeding can enhance global food security.

Encouraging developed and developing countries to be more active participants in international bodies such as the WTO and other trade organization is important. This will help promote consumption of healthy food and establishment of consumer protection rules. It is also a way to improve policies and consumer and producer awareness. Discussions at the WTO need to be broadened to take account of the important role that voluntary standards play in influencing global trade patterns in food and agricultural markets [Shepherd and Wilson 2013]. Most discussion focuses on mandatory standards, but voluntary standards also matter.

Promotion of healthy life styles to decrease obesity should be national priorities. Health standards, improved food processing technologies, and consumer demand for safety standards should be addressed worldwide [Rahmat et al. 2016]. It is not only necessary to make more food available, but it is also important to make high quality food accessible. This can be

accomplished through education, fortifying foods with vitamins and minerals, and encouraging a diversified diet and healthier choices [Pinstrup-Andersen and Pandya-Lorch 2001].

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WPŁYW AKCESJI NOWYCH KRAJÓW CZŁONKOWSKICH NA BEZPIECZEŃSTWO ŻYWNOŚCI I OTYŁOŚĆ W UNII EUROPEJSKIEJ

STRESZCZENIE

Celem pracy było przedstawienie bezpieczeństwa żywności w krajach UE oraz problem otyłości wśród mieszkańców krajów członkowskich. Globalny wskaźnik bezpieczeństwa żywnościowego (ang. *Global Food Security* – GFSI) został przeanalizowany w latach 2012–2016. Do analizy wyników autorzy artykułu wykorzystali metody tabelaryczne, graficzne i opisowe. Źródłem informacji były dane FAO. Na początku zaprezentowano GFSI, a później jego zmiany i kształtowanie się otyłości wśród ludności UE. Globalny wskaźnik bezpieczeństwa żywnościowego w 2016 roku był najwyższy w Irlandii (84,3) i Holandii (82,6), a najniższy odnotowano w Bułgarii (60,6), Rumunii (65,6) i na Słowacji (67,7). Wyniki wskazują, że największy wzrost wskaźnika GFSI w tym okresie zaobserwowano w Wielkiej Brytanii (+3.1), Irlandii (+2,4) i Niemczech (+1,4). Autorzy artykułu analizowali również otyłość, która jest skutkiem nadmiernej konsumpcji żywności w krajach rozwiniętych i rozwijających się. W analizach wykazano, że najwyższe wskaźniki otyłości występują w Wielkiej Brytanii (28,1%), Czechach (26,8%), na Słowacji (25,7%) i w Irlandii (25,6%).

Słowa kluczowe: bezpieczeństwo żywności, otyłość, kraje UE