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The Place of the Polish Food Industry in the European Union

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Abstract. The Polish food industry holds an important place in the EU food industry. In 2016, Poland was the 6th largest producer of food in the EU-28, with the share of 8.6% in the European output of the food industry. In the years 2004-2016, the output value of the Polish food sector expressed in comparable prices (adjusted by the purchasing power index in EUR) increased by nearly 60% to EUR 95.4 billion, whereby the EU-15 countries recorded an increase by just 25% to EUR 914 billion and the EU-13 countries an increase by 33% to EUR 192.5 billion. Over 80% of the food produced in the EU comes from EU-15 countries, and its main producers are: Germany (16.3% of the share of the EU food industry production), France (14.0%), Italy (12.2%), Spain (10.7%) and the United Kingdom (9.8%). That implies that the development pace of the Polish food sector during the analysed period was among the fastest across the EU, which reduced the distance between polish food industry and the most developed EU countries, and Poland strengthened its position on the EU market. That contributed to enhancing labour productivity and increasing the turnover generated by enterprises in the food industry in Poland.

Keywords: Food Industry, Output Value of the Food Industry, Food Producers, Poland, EU.

1 Introduction

The objective of the study is to present the place of the Polish food industry in the years 2004-2016 against selected Member States of the EU-28, in particular those being major food producers in the European Union, i.e. Germany, France, Italy, Spain and Great Britain. The comparison covered, inter alia: the value of marketed production, employment, labour productivity and turnover values of enterprises.

The years 2004-2016 were marked by a very fast development of the Polish food industry. The output value of this sector in current prices increased by nearly 84%, while the EU-15 countries recorded an increase by just 24% and the EU-12/13 countries an increase by 65%. During the analysed period, the greatest increase in the output value of this industry was recorded, apart from Poland, by Bulgaria and Lithuania – with the value having nearly doubled. On the other hand, the largest food producers in the EU recorded different growth rates: Germany (+18%), France (+23%), Italy (+24%), Spain (+34%), Great Britain (+14%). However, considering the purchasing power index in EUR for individual countries and using it to adjust the output value of the food industry in current prices, the increase in the turnover of the food industry becomes slightly different. In the years 2004-2016, Poland recorded an increase in the

Table 1. The Polish food industry against other Member States of the EU-28 in 2016 [1].

EU countries	Output value of the food industry (billion EUR) in		Change in the value of food industry production* 2016/2004 (in %)	Output of the food industry* per 1 resident in thousand EUR	Ratio of the output value of the food industry* to GDP (in %)
	current prices	comparable prices*			
EU-28	1075.9	1106.5	26.7	2.17	7.4
EU-15	964.5	914.0	25.5	2.25	7.1
EU-13	111.4	192.5	33.0	1.84	9.3
Belgium	45.2	41.5	47.7	3.67	10.7
Bulgaria	5.7	12.0	50.6	1.67	11.9
Czech Rep.	11.7	17.8	-7.4	1.69	6.6
Denmark	22.7	16.9	9.5	2.96	8.2
Germany	191.1	179.9	18.2	2.19	6.0
Estonia	1.6	2.2	35.8	1.69	7.4
Ireland	25.7	23.2	29.7	4.94	9.4
Greece	13.1	15.9	31.7	1.48	7.4
Spain	107.2	118.8	33.9	2.56	9.6
France	169.6	154.4	25.7	2.31	7.6
Croatia	4.5	7.1	-19.2	1.69	9.7
Italy	132.6	135.0	33.4	2.22	7.8
Cyprus	1.3	1.5	21.5	1.88	7.2
Latvia	1.6	2.4	-5.4	1.20	6.5
Lithuania	3.8	6.2	52.2	2.14	9.8
Luxemburg	0.9	0.7	4.1	1.17	1.6
Hungary	11.0	18.7	16.1	1.91	9.7
Malta	0.1	0.1	3.4	0.20	0.8
Netherlands	67.9	61.0	33.3	3.59	9.6
Austria	21.3	19.5	69.6	2.24	6.0
Poland	**53.8**	**95.4**	**59.6**	**2.51**	**12.5**
Portugal	14.5	18.3	39.4	1.78	7.8
Romania	10.9	21.6	31.5	1.09	6.4
Slovenia	1.9	2.3	0.8	1.10	4.6
Slovakia	3.5	5.2	11.1	0.96	4.3
Finland	10.2	8.3	16.5	1.51	4.7
Sweden	16.3	12.4	5.3	1.25	3.5
G. Britain	126.2	108.2	8.3	1.65	5.2

* in comparable prices, i.e. in current prices adjusted by PPP

respective output of the food industry by nearly 60%. Higher growth was only in Austria (+70%). To compare, the value of marketed production increased by 26% in the EU-15 countries, and by 42% in the EU-12/13 countries (Tab. 1).

The integration with the EU had a favourable impact on the development of the Polish food industry [4]. It forced Polish enterprises in the food sector to restructure their processing plants to adjust them to the European requirements and standards [5]. Therefore, Polish enterprises in the food sector are currently deemed one of the most modern across the European Union, while the Polish food industry has become a major food producer in the EU [9]. In 2016, Poland was the 6th largest food producer in the EU, with the share of 8.6% in the European output of the food industry.

2 Materials and Methods

The development of the Polish food industry against selected Member States of the EU in the years 2004-2016 was assessed based on Eurostat data. The variability of marketed production of the food industry was calculated by means of the average annual growth rate, the trend function linear regression analysis (in absolute terms) and the compound interest formula [7] (in relative terms).

$$Kn = Ko \times (1 + r/100)\ n\text{-}1 \tag{1}$$

$$r = (\surd(n\text{-}1\&Kn/Ko)\ -1)\ \times 100 \tag{2}$$

where:

Ko – value of the variable in the starting period,
Kn – value of the variable in the final period,
r – growth rate, average annual growth pace.

The comparability of the output value of the food industry in the Member States of the EU was ensured by adjusting the output value in current prices into comparable prices, by means of the purchasing power (parities) index in EUR for individual Member States of the EU. Purchasing power parity (PPP) – the exchange rate calculated based on the comparison of prices of goods and services in a fixed basket in different countries during the same period, expressed in local currencies. The aim of the study is to present the place of the Polish food industry in the years 2004-2016 against selected Member States of the EU-28. The aim of the study is to show the position of the Polish food industry against the background of EU countries in the period of integration with the EU (2004-2016).

3 Results and Discussion

3.1 Comparative Assessment of the Development of the Polish Food Industry against the EU in the Years 2004-2016

The European Union has been a major food producer in the world for years now. The EU-15 countries produce over 80% of the output, with the main producers being: Germany with the share of 16.3% in the output value of the European food industry, France (13.9%), Italy (12.2%), Spain (10.7%) and Great Britain (9.8%). Poland is the 6^{th} largest food producer in the EU, with the share of 8.6% in the output value of the EU food industry. The output of the Polish food industry (in comparable prices), amounted to EUR 95.4 billion in 2016, mostly in the group of the EU-13 countries. However, this value is nearly two times lower than in Germany (EUR 179.9 billion), but higher than in Holland (61.4) or Belgium (41.5) (Tab. 1).

The food industry is more important for the Polish economy than for the Member States of the EU [8]. In 2016, the turnover of this sector accounted for 12.5% of Polish GDP and was the highest in the EU-28. To compare, this ratio amounted to 7.1% for the EU-15 countries, and 9.3% for the EU-13 countries. In the EU-15, the highest ratio of the output value of the food industry to GDP in 2016 was achieved by: Belgium (10.7%), Spain and Holland (9.6%), but it amounted to as little as 6.0% in Germany and 5.2% in Great Britain. In the EU-13, the highest ratio was recorded by Bulgaria (11.9%), and the lowest one by Slovakia (4.3%) and Malta (0.8%). In the majority of the Member States of the EU, the ratio declined in the years 2004-2016, in particular in the EU-13 countries (nearly by 40% on average). The greatest decrease was experienced by Slovakia (by 37%) and Romania (by 35%). On the other hand, Poland witnessed an increase by 10%. During the analysed period, the ratio improved only in a few countries of the EU, above all in Greece – by 44%, Austria – by 22%, and in Italy – by 11% (Tab. 1).

In 2016, the Polish food industry had a value of EUR 2.5 thousand, expressed in the value of marketed production per capita, and was similar to the largest food producers in the EU, i.e. Spain (EUR 2.5 thousand), France (EUR 2.3 thousand), and Italy and Germany (EUR 2.2 thousand each). On the other hand, the lowest value was characteristic for Ireland (EUR 4.9 thousand), Belgium (EUR 3.7 thousand), Holland (EUR 3.6 thousand) and Denmark (EUR 3.0 thousand) (Tab. 1).

In the years 2004-2016, the output value of the food industry in the EU-28 increased at an average pace of 2% a year, whereby the growth rate was equal to 4.0% in Poland, if compared with France (1.9%), Germany (1.4%) and Great Britain (0.7%) (Table 2). However, considering its fluctuations in selected periods during the years 2004-2016, the years directly after the accession to the EU 2004-2007 were the best for Poland [11]. At that time, the output value of the food industry increased at an annual pace of 7.6%, three times faster than in Germany and in the EU-15. On the other hand, the years 2013-2016 brought a lower growth rate of the output value in the majority of the Member States of the EU, excluding Spain (+3.6%) and Italy (+3.1%) (Tab. 2).

Table 2. The growth rate of the output value of the food industry in selected countries of the EU-28 (in %, on an annual basis), in comparable prices [1].

EU countries	2004-2016	2004-2007	2008-2012	2013-2016
EU-28	2.0	2.6	1.8	1.4
EU-15	1.9	2.3	1.5	1.5
EU-13	2.4	4.1	3.0	0.9
Austria	4.5	3.0	3.4	2.2
Belgium	3.3	5.5	3.7	1.3
Germany	1.4	2.8	1.0	-0.1
Spain	2.5	4.5	0.8	3.6
France	1.9	3.7	1.0	1.6
Ireland	2.2	0.4	7.7	2.1
Italy	2.4	2.3	1.7	3.1
Netherlands	2.4	4.6	2.1	0.9
G. Britain	0.7	-4.9	1.6	0.9
Poland	4.0	7.6	5.6	1.6
Czech Rep.	-0.6	-0.6	-1.1	-0.5
Hungary	1.3	-1.6	3.6	0.3
Lithuania	3.6	8.5	3.8	-1.3
Romania	2.3	4.1	1.8	0.4
Bulgaria	3.5	6.8	-0.1	2.2

3.2. Employment and Labour Productivity in the Food Industry in the EU

There are approx. 411 thousand workers in the Polish food industry, which accounts for approx. 9% of the total number of workers in the food industry in the European Union. Poland takes the forth position among the EU-28 countries. A higher volume of employment (in thousand workers) is created only by: Germany (874), France (604) and Great Britain (441), and a slightly lower volume by: Spain and Italy (approx. 360 each). The years 2004-2016 witnessed a decrease in employment in the food industry in the EU-28 by 2.2%, whereby by 11.3% in the EU-13, compensated by an increase by 1.2% in the EU-15. During that period, the volume of employment shrank by 3% in Poland (Tab. 3).

In 2016, the value of marketed production per one worker in the Polish food industry amounted to EUR 232 thousand, slightly below the EU-15 average (EUR 272 thousand). The highest labour productivity in the food sector was achieved by Holland (EUR 481 thousand) and Belgium (EUR 459 thousand) (Table 3). The Polish food industry had the highest labour productivity in the EU-13, higher by 33% than their EU-13 average (EUR 175 thousand). In the years 2004-2016, labour productivity in the Polish industry improved by 65%, by 24% in the EU-15 and by 50% in the EU-13. Branches of the food industry with a very high and high degree of globalization reported high level of labour productivity [2]. Its improvement was mainly driven by the increased expenditures for technical equipment. That resulted from a significant investment boom, in particular following Poland's accession to the EU, and the decreased volume of employment [10]. The improved labour productivity in the food industry was a common phenomenon experienced by all the EU Member States.

Table 3. Employment and labour productivity in the food industry in selected Member States of the EU-28 [1].

EU countries	Employment (in thousand)		Labour productivity* (in thousand EUR per worker)		Growth rate of labour productivity 2016/2004	Average growth rate of labour productivity in the years 2004-2016 (in %, on an annual basis)
	2004	2016	2004	2016		
UE-28	4561.5	4462.4	191.4	248.0	29.6	2.2
UE-15	3319.0	3359.9	219.5	272.0	24.0	1.8
UE-13	1242.5	1102.4	116.5	174.6	50.0	3.4
Austria	74.6	81.2	154.2	240.0	55.7	3.8
Belgium	91.6	90.4	306.8	459.0	49.6	3.4
Germany	824.4	873.6	184.6	205.9	11.5	0.9
Spain	363.5	373.2	244.0	318.4	30.5	2.2
France	616.6	603.6	199.2	255.8	28.4	2.1
Ireland	47.5	50.8	376.8	457.0	21.3	1.6
Italy	347.5	361.2	291.2	373.7	28.3	2.1
Netherlands	127.2	126.8	360.1	481.4	33.7	2.5
G. Britain	470.9	440.7	212.1	245.4	15.7	1.2
Poland	**423.5**	**411.0**	**141.2**	**232.2**	**64.5**	**4.2**
Czech Rep.	123.9	104.0	144.5	171.0	18.3	1.4
Hungary	128.3	103.0	125.5	181.5	44.6	3.1
Lithuania	53.3	42.3	76.9	147.7	92.0	5.6
Romania	203.6	181.6	80.6	118.7	47.4	3.3
Bulgaria	105.6	93.0	75.8	129.6	71.0	4.6

*in comparable prices

In the years 2004-2016, labour productivity in the Polish food industry increased at an average pace of 4.2% a year, if compared with the annual rate of 1.8% in the EU-15 and the annual rate of 3.4% in the EU-13. The greatest growth rate of labour productivity during the analysed period was recorded by Lithuania (5.6% on an annual basis) and Bulgaria (4.6%) (Tab. 3).

3.3 Concentration of Production in the Food Industry in the EU

In 2016, the Polish food industry counted approx. 14.4 thousand enterprises. That was equal to nearly 5% of the European food enterprises and placed Poland on the 6th position in the EU-28. In the years 2004-2016, the number fell by 21.4% in Poland, and by 8.3% in the EU-15 and by 11% in the EU-13. The turnover generated by an average enterprise indicates an increase in the economic strength and competitiveness of Polish food enterprises on the European market [6]. In 2016, the turnover of the food processing enterprise amounted to EUR 6.64 million in Poland and was twice as high as in 2004. In the same year, the average turnover of the food enterprise was equal to EUR 3.88 million in the EU-15, and EUR 3.20 million in the EU-13. If compared with the EU, Polish food enterprises have quite a good position. The average turnover generated by these enterprises are comparable with the German ones (EUR 6.76 million) and much higher than in: Spain, France and Italy. However, they are much below the level characteristic for: Ireland (EUR 12.54 million), Great Britain (EUR 11.03 million) and Holland (EUR 9.58 million).

Table 4. The average turnover of enterprises* in the food industry of the selected Member States of the EU-28 measured by the output value of 1 food enterprise, in million EUR [1].

EU countries	Number of enterprises (in thousand)		Average turnover value* (in million EUR)		Turnover growth 2016/2004	Average turnover growth rate in the years 2004-2016 (in %, on an annual basis)
	2004	2016	2004	2016		
UE-28	311.1	295.6	2.81	3.74	33.1	2.4
UE-15	256.9	235.5	2.84	3.88	36.6	2.7
UE-13	54.2	60.2	2.67	3.20	19.9	1.5
Austria	4.3	3.9	2.66	5.00	88.0	5.4
Belgium	8.2	6.9	3.42	5.98	74.9	4.8
Germany	32.6	26.6	4.67	6.76	44.8	3.1
Spain	29.9	27.5	2.97	4.32	45.5	3.2
France	68.2	59.8	1.80	2.58	43.3	3.0
Ireland	0.6	1.9	29.83	12.55	-57.9	-7.0
Italy	70.1	56.8	1.44	2.38	65.3	4.2
Netherlands	4.6	6.4	10.04	9.59	-4.5	-0.4
G. Britain	7.1	9.8	14.13	11.03	-21.9	-2.0
Poland	**18.3**	**14.4**	**3.27**	**6.64**	**103.1**	**6.1**
Czech Rep.	6.1	9.8	3.15	1.81	-42.5	-4.5
Hungary	7.0	6.8	2.31	2.73	18.2	1.4
Lithuania	1.2	1.7	3.33	3.58	7.5	0.6
Romania	10.9	8.8	1.50	2.46	64.0	4.2
Bulgaria	6.4	6.3	1.26	1.91	51.6	3.6

* in comparable prices

The concentration and consolidation of the food sector are progressing across the European Union. In Poland, the process is much faster than in the majority of the remaining Member States of the EU [3]. The gap between Poland and the EU Member States with a high production concentration in this sector is shrinking.

4 Conclusions

In the years 2004-2016, Poland strengthened its place on the European market as one of the largest food producers in the EU. The share of the Polish food industry increased to 8.6% of the value of marketed production of the food industry in the EU-28 (in comparable prices), which implies an increase by 1.7 pp in comparison with 2004. Poland is the 6th largest food producer in the EU, following: Germany, France, Italy, Spain and Great Britain.

In the years 2004-2016, the growth pace of the Polish food industry measured by the increase in the value of marketed production amounted to 4.0% on an annual basis and was double the average pace in the EU-28 and even faster than the one experienced by the largest food producers in the European Union, i.e. Germany (1.4%), France (1.9%), Italy (2.4%), Spain (2.5%) and Great Britain (0.7%).

The labour productivity of the Polish food industry measured by the value of marketed production per one worker (in comparable prices) increased by 64.5% in the years 2004-2016 (i.e. at the annual pace of approx. 4.2%). In 2016, the labour productivity of the Polish food industry corresponded to 85% of the average labour productivity in the EU-15 countries, which means that the gap between the Polish food industry and the EU-15 countries shrank by 21 pp during the analysed period.

In 2016, the turnover generated by enterprises in the Polish food processing industry amounted to EUR 6.6 million per enterprise (in comparable prices) and was over two times higher than in 2004 and exceeded the average turnover of food enterprises in the EU-15 by 70%.

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