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# CONFRONTING THE POLISH DAIRY INDUSTRY WITH THE INTERNATIONAL COMPETITION IN THE EU FOOD MARKET

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**Abstract**

During the Polish membership in the European Union and right before accession, the dairy industry has been subject to a in-depth process of restructuring and modernization. These processes made it possible to achieve the required veterinary and sanitary standards and to adapt the production to the market requirements. A basis for the structural transformation were implemented investments which contributed to modernization of the production process and to restructuring of employment. These positive developments are well reflected by the increased concentration of both the resource base and the production in the dairy industry, the improved labour efficiency and productivity of assets, as well as the gradual increase in the effectiveness of milk processing. In the process of investing, an important role has been played by support from EU funds, which became a stimulus to accelerate the process of modernization of dairy companies. Modernization of milk processing also enabled a significant improvement in the quality of products, which became an important factor in competitiveness both in the domestic and international market. Implemented investments, first of all, in modern production lines, have determined the good situation of the sector and the success achieved by its leaders in foreign markets. Today, Polish milk processing plants are considered one of the most modern plants in the European Union and Polish dairy industry became a major producer of milk and milk products in the EU. Poland is their fourth producer, with the 8% share in the EU dairy industry's production value. The years 2004-2014 are a period of the dynamic development of the Polish dairy industry. The employment in the Polish dairy industry decreased by more than 20%, which was reflected in the improved labour productivity. However, the labour productivity in the Polish dairy industry is still much lower than the EU-15 average, although these differences are decreasing year by year. Currently the Polish dairy industry belongs to the leading producers of dairy products in the EU and has a strong competitive position in the international market.

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## 1. Introduction

The aim of this paper is to study the long-term relationship between oil prices and economic activity. Unlike most of the existing literature, which focuses on Western countries, we analyze the relationship between oil prices and GDP in a group of oil exporting countries, belonging to the Organization of the Petroleum Exporting Countries (OPEC).

The dairy sector is very important to the food industry in Poland. It is indicated by a large share of milk in agricultural commodity production (16.5%) and a significant share of the dairy sector in sales revenue (13%) and employment (10%) in the food industry. Milk and dairy products are an important source of income and food for numerous cow holdings. The Polish dairy sector is also a net exporter (its share in the food trade balance is around 12%) and holds a significant share in the value of export of agri-food products (7%). Poland is a major producer of milk and dairy products in the world (2-3%), and particular in the European Union (about 12%).

The transition of the Polish economy to the free market system (in the 1990s) and subsequently accession to the EU (in 2004) led to a fundamental change in market conditions in an environment of the Polish dairy industry. A change in the supply and demand situation on the domestic market and on international markets, and a change in policy towards the sector, in particular a market regulation system, allowed the profound sectoral restructuring and modernisation process to be initiated, both in the agricultural and processing sphere. Structural and ownership transformations on holdings and in dairy enterprises made milk production and processing more concentrated. The process is not yet complete, as the sector is still quite fragmented compared to its main competitors on the world market, but progress achieved in this respect is enormous. The modernisation of holdings and processing enterprises led to meeting veterinary, sanitary and quality standards required in the EU and adjusting the dairy industry's production structure to the changing demand of ever-more demanding consumers.

Changing market conditions also had a strong impact on international trade in dairy products and on the international competitiveness of the sector. Systemic transformations coincided with the liberalisation of trade in agricultural products under the Uruguay Round of the GATT, and then of the WTO. During this period, enterprises in the sector little benefited from market support under these provisions. Accession to the EU brought the first major changes in foreign trade conditions. Free access to the large and well-developed market and the introduction of Common Agricultural Policy (CAP) instruments meant a level playing field for producers from other EU Member States not only in terms of access to the EU market, but also support for export and domestic customs protection. Market transformations were accompanied by the inclusion of the Polish dairy industry in global processes as demonstrated by, *inter alia*, foreign

direct investment (FDI) by transnational corporations (TNCs). In fact, the dairy industry is not highly globalised (TNCs' share in sales is about 15%), and its FDI absolute value was not high, but such investment was crucial to the development of certain dairy market segments and forced domestic producers to intensively adjust to competition conditions on the international market.

The change in market conditions had a positive impact on the development of foreign trade in dairy products. Under conditions of relative domestic demand stabilisation, growing export became a decisive factor in the development of the sector. Free access to the EU market and thus increasingly stronger links between the sector and the EU market led to significant changes in the geographical structure of export – the EU's share in export rose to about 75%. The commodity structure of export of dairy products changed as well. In fact, modernisation processes in the Polish dairy industry were reflected in a higher share of highly processed products in the structure of export. Consequently, the commodity structure of Polish export came closer to the export structure of highly economically developed countries. For many years, the Polish dairy sector has been characterised by a surplus of export over import in terms of quantity and value, being thus a stable net exporter. Since accession to the EU, the positive balance of trade in dairy products has been steadily increasing which is undoubtedly positive. Generally intensive trade, which is a source of a permanent trade surplus, serves the development of the sector and facilitates its transnational economic integration.

However, the Polish dairy industry does not fully exploit its export potential which, in line with the theory of abundance of resources of factors of production, includes primarily potential for milk production in agriculture, potential for dairy processing in the dairy industry and competitive potential on international markets. It is indicated by, *inter alia*, a surplus of production over domestic consumption measured by the self-sufficiency ratio (116% in 2016). Natural conditions and resources of factors of production and the possibility of improving the genetic material of cows offer opportunities for increasing milk production in agriculture. The dairy industry also enjoys large production potential which allows for the development of processing and the flexible adjustment of supply to changes in demand on both the domestic market and on international markets. Opportunities for promotion and advertising or access to retail chains in other countries are still under-exploited. As a result, the competitive position of Polish producers on external markets, although improved in the past decade, is still not strong enough in many market segments. One indication may be a low number of EU-registered regional dairy products and no branded products (e.g. cheese) recognised on the world market. The Polish dairy sector thus continues to face challenges of making better use of its production, processing and competitive potential. Success in export and an increase in the share in the international market can only be achieved with broadly understood, more effective use of factors of

production, and promotional and advertising activity both at the sectoral and individual level.

The aim of the paper is to present the development of the Polish dairy industry's restructuring and modernisation processes after Poland's accession to the European Union, and to assess the current position of the Polish dairy industry against the background of selected EU Member States, in particular major producers of dairy products[1] in Europe, i.e. France, Germany, Italy, the Netherlands, Spain, the United Kingdom and Belgium. To analyse the competitive position of the Polish dairy industry in the EU, we compared, *inter alia*: the value of marketed production, employment, labour productivity and production concentration. Data were derived from the Eurostat database. Before the assessment, we analysed structural transformations in the Polish dairy industry during Poland's membership in the European Union based on data from national statistics (Central Statistical Office (CSO), Ministry of Finance, etc.). The research presented in this paper covers primarily 2004-2014 (and rarely 2016).

## 2. Restructuring and Modernisation Processes in the Polish Dairy Industry

The Polish dairy industry has undergone the profound restructuring and modernisation process in recent years. Its confrontation with strong international competition on the EU and global food market was preceded by processes of adjustment to functioning according to market economy principles and EU regulations. Consequently, the Polish dairy industry became one of the most modern sectors of the Polish food industry, being capable of not only presenting an attractive offer of good quality dairy products at competitive prices to a domestic consumer, but also effectively competing on the demanding international market.

Structural transformations in the dairy industry consisted mainly in increasing production concentration, improving milk processing effectiveness and making establishments undergo substantial modernisation. In 2004-2016, the number of dairy enterprises decreased by 34% to 175, employment – by 20% to 32.4 thousand persons, while deliveries of milk to establishments increased by 39%. Thus, the statistical size of dairies – measured by the volume of processed milk – more than doubled to 63.5 thousand tonnes, and – measured by sales value – increased by 61% to PLN 27.6 billion. The dynamics of revenue per 1 enterprise was even higher, as the average revenue per 1 enterprise increased nearly two-and-a-half fold to PLN 158 million. Milk processing effectiveness – measured by labour productivity – improved as well. Milk processing per 1 employee increased

[1] The term "dairy products" means: milk and cream (not concentrated), milk powder, buttermilk, curdled milk, yoghurt, kephir, whey, butter, cheese.

in the analysed period by over 73% and – measured by sales value – increased twofold (Table 1).

**Table 1.** Milk production and processing in Poland

| Item | 2004 | 2010 | 2016 | Change ratio 2016/2004 |
|---|---|---|---|---|
| Milk production ['000 tonnes] | 11,810 | 12,270 | 13,275 | 112.4 |
| Milk collection ['000 tonnes] | 8,002 | 9,024 | 11,125 | 139.0 |
| Number of enterprises* | 265 | 205 | 175 | 66.0 |
| Employment ['000 persons]* | 40.4 | 34.9 | 32.4 | 80.2 |
| Sales revenue [PLN '000 000]* | 17,191 | 23,133 | 27,637 | 160.7 |
| Milk processing per 1 enterprise ['000 tonnes] | 30.2 | 44.0 | 63.5 | 210.3 |
| Sales revenue per 1 enterprise [PLN '000 000] | 64.9 | 112.8 | 157.9 | 243.3 |
| Milk processing per 1 employee ['000 kg] | 198 | 258 | 343 | 173.2 |
| Sales revenue per 1 employee [PLN '000] | 425.5 | 662.8 | 853.0 | 200.5 |
| Export ['000 tonnes in milk equivalent] | 2,060 | 2,165 | 3,900 | 189.3 |
| Import ['000 tonnes in milk equivalent] | 505 | 815 | 1,790 | 358.0 |

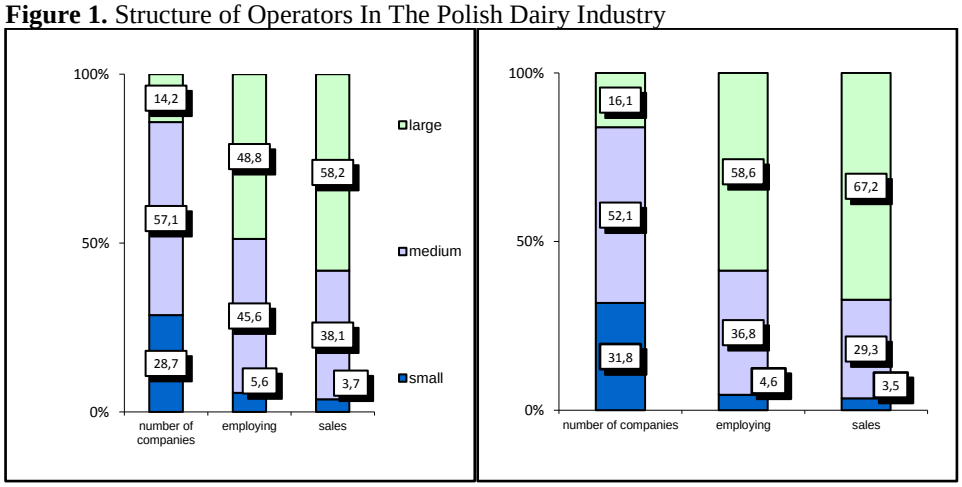
* only enterprises with over 9 employees

**Source:** Own elaboration based on: Szajner, 2017, p. 3; Rynek Mleka, Stan i perspektywy nr 22-53, „Analizy Rynkowe", 2005-2017.

Poland is a net exporter of dairy products and foreign trade is important to their market balance. During EU membership, there was a dynamic increase in trade, as export expressed in raw milk equivalent nearly doubled to about 4 million tonnes and import increased three-and-a-half fold to 1.7 million tonnes. At present, export accounts for about 35% of milk collection compared to about 20% in 2004. The dynamic import growth makes foreign trade reveal its increasing intra-sectoral intensity. In 2016, the share of import in market supply was 16%, while in 2004 – only about 4%. Products for secondary processing, most of which are then exported, play an important part in import. The share of final consumer products in import remains low (Szajner, 2017, p. 2).

Despite great progress in concentration processes, the fragmentation of the Polish dairy industry is still one of the main factors reducing its competitive edge, in particular in the context of changes ongoing in the market environment (increasing market openness, high price volatility and rising price risk, increasing competition, continued trade concentration and growing consumer demands). In 2004, large enterprises with over 249 employees accounted for 14% of enterprises in the Polish dairy industry. Their share in product sales revenue was 58%, while in employment – about 49%. In 2014, large enterprises accounted for 16% of enterprises in total, their share in sales revenue was over 67%, while in employment – 59%. Small and medium-sized enterprises significantly reduced their market share (Figure 1).

**Figure 1.** Structure of Operators In The Polish Dairy Industry

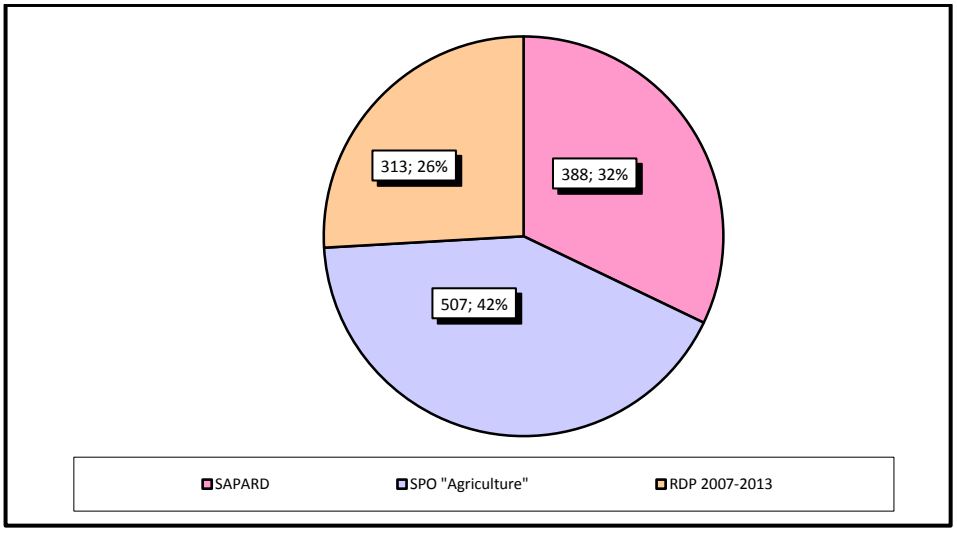



2004 2014

**Source**: Own elaboration based on unpublished CSO data.

The modernisation processes ongoing in the Polish dairy industry can be divided into three stages: adjustment to market economy conditions, adjustment to veterinary and sanitary standards and EU market regulations, and adjustment to competition on the common EU market and progressive globalisation processes. However, please note that particularly large investment was made between 1998 and 2003, when establishments adjusted to EU standards and investment was made from not only national, but also EU funds (SAPARD – Special Accession Programme for Agriculture and Rural Development, SOP – Sectoral Operational Programme) (Urban, Drożdż and Staszczak, 2008, p.p. 105-106). In 2003-2013, Poland contributed over PLN 1.2 billion under these support programmes to co-finance investment in the dairy industry (Figure 2) which accounted for nearly 14.5% of the total value of capital expenditure incurred in this period in the industry. To co-finance investment activities, an entrepreneur had to contribute own funds as a result of which the final value of completed investment was at least twofold higher.

**Figure 2.** Support for Investment in The Dairy Industry under EU Aid Programmes in 2003-2013 [Value in Pln '000 000 and Structure in %]




**Source:** Own elaboration based on: Tereszczuk, 2014, p. 85.

The implementation of mandatory and non-mandatory food safety and quality management systems contributed to improving the quality of dairy products. Poland, just like the EU, has legal regulations in place on the production of and trade in food, including legal regulations rendering the implementation and application of some of these systems mandatory (Morkis, 2014, p.p. 116-117). Mandatory quality management systems in food enterprises include:

- Good Hygienic Practice (GHP),
- Good Manufacturing Practice (GMP),
- Hazard Analysis and Critical Control Point (HACCP).

Data from the Veterinary Inspection reveal that all dairy enterprises in 2015, just like in 2013-2014, implemented and applied GHP and GMP systems. However, the mandatory HACCP system was implemented by only 67% of establishments[2] (Judzińska, 2017, p. 103).

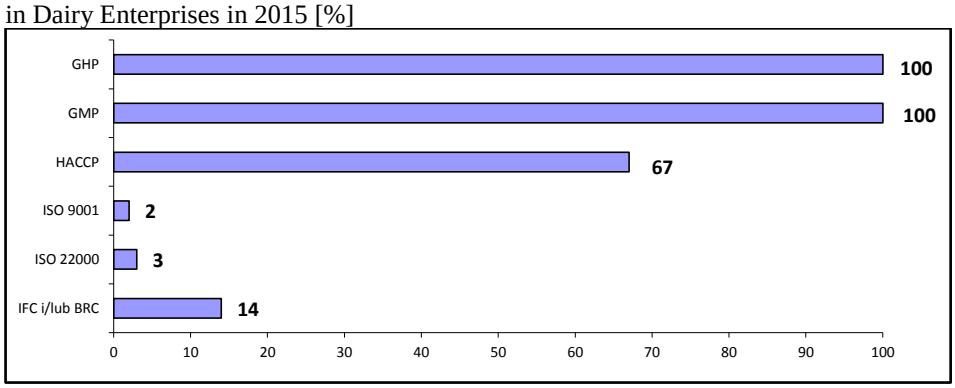
Non-mandatory quality management systems, which can be used in the food industry both in Poland and in the EU, are primarily: an ISO 9000-series (ISO 9001) quality management system, an ISO 22000 (ISO 22000) food safety management system and own internal quality management systems as well as

[2] Other dairy enterprises are micro-enterprises or start-ups which failed to comply with the obligation to implement the system.

audit and certification standards, i.e. the International Food Standard (IFS) and the British Retail Consortium (BRC). The implementation and application of ISO 9000-series quality management ensure that an enterprise's products are of consistent and repeatable quality. The implementation of ISO 9001 is one of factors improving an enterprise's management, i.e. making it more competitive and credible, as well as improving the quality of its products. The ISO 22000 food safety management system brings together HACCP and GP requirements. The primary goal of the IFS and the BRC is to ensure the safety of food sold in retail chains (Morkis, 2014, p.p. 117-118).

The implementation of non-mandatory quality management systems is voluntary. Each dairy enterprise may thus implement them voluntarily or if required by national and mostly foreign recipients (which is increasingly common). The percentage of enterprises applying non-mandatory quality management systems and having them certified by certification enterprises in the dairy industry in 2015 was low (Figure 3).

**Figure 3.** State of Implementation of Selected Quality Management Systems in Dairy Enterprises in 2015 [%]



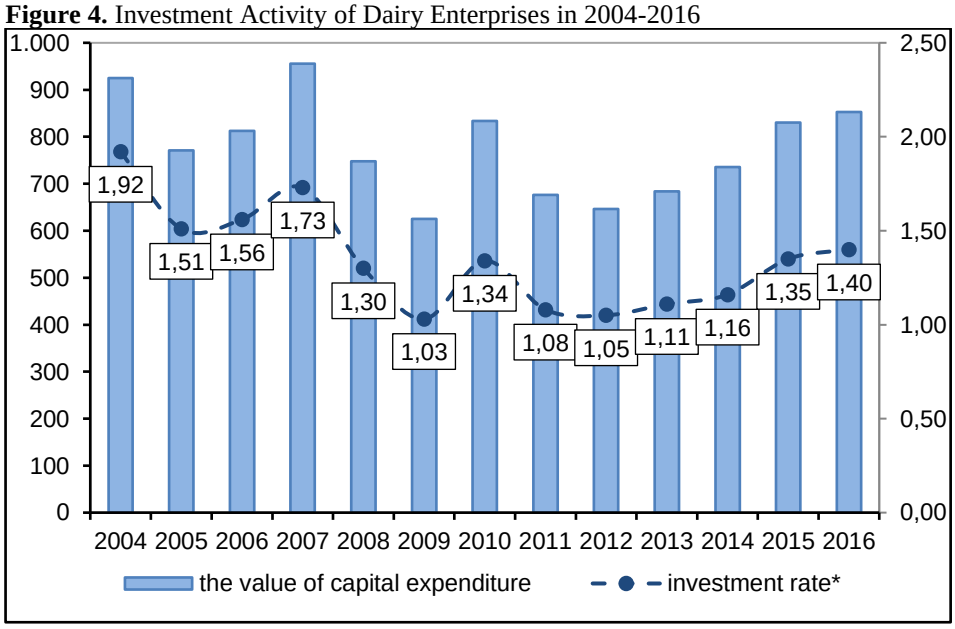

**Source:** Own elaboration based on: Judzińska, 2017, p.104-106.

The implementation of mandatory quality management systems in the first period of EU membership was one of factors making Polish dairy enterprises, in particular on the international market, more competitive. Thirteen years after accession, the application of mandatory quality management systems is no longer an important instrument of competition on the domestic or international market, but rather a necessary condition for enterprises to operate. At present, the implementation of non-mandatory quality management systems may help make Polish enterprises more competitive (Szczepaniak, 2015, p. 10).

After Poland's accession to the EU, investment in the dairy industry was facilitated by public financial support. Already ahead of accession, Polish entrepreneurs in the sector could benefit from EU co-financing for the development and modernisation of processing establishments, in particular under SAPARD Measure 1. "Improving processing and marketing of agricultural and fishery

products". In the following years, support for investment activities in the dairy sector from EU funds was continued as part of the Sectoral Operational Programme "Restructuring and Modernisation of the Food Sector and Rural Development 2004-2006" (SOP "Agriculture") under Measure 1.5. "Improving processing and marketing of agricultural products", and subsequently as part of the Rural Development Programme 2007-2013 (RDP 2007-2013) under Measure 1.2.3. "Increasing the added value of basic agricultural and forestry production" (Tereszczuk, 2014, p.p. 83-88).

**Figure 4.** Investment Activity of Dairy Enterprises in 2004-2016




* ratio of the value of capital expenditure to the value of depreciation
**Source:** Own elaboration based on unpublished CSO data.

In 2004-2016, the total value of capital expenditure in the Polish dairy industry was PLN 10.1 billion, i.e. PLN 0.78 billion per year (Figure 4). The highest share in the structure of capital expenditure was that of expenditure on machinery, equipment and means of transport (77%), i.e. on the so-called active fixed assets directly used for modernising the manufacturing potential of establishments. A relatively high share was also that of expenditure on buildings and structures (21%). However, dairy enterprises invested relatively little in environmental protection or research and development (R&D). In the analysed period, capital expenditure was characterised by fluctuations which were clearly related to the market situation. Investment activity increased in years of high prices of dairy products (e.g. 2007, 2010, 2014). However, capital expenditure decreased in years of global financial crises (2009, 2011).

## 3. Production of Dairy Products

Restructuring and modernisation processes, which had taken place in the Polish dairy industry, had a major impact on changes in dairy production. In 2004-2016, the production of all dairy products increased which was mainly due to a significant increase in deliveries of raw milk for processing. High dynamics was observed in the production of processed liquid milk, i.e. consumer and processed milk used in secondary processing. A large increase was recorded in the production of yoghurt, fermented beverages and cream (Table 2). Another increase was observed in cheese-making, specifically in the production of curd and ripened cheese. The dynamics of processed cheese production decreased. Large investment in whey production lines made the production of whey powder increase nearly fivefold. Minor changes were recorded in the production of butter whose consumption was stable and export grew very slowly. The production of milk powder increased as well, but not much compared to other products. The highest share in the production of dairy products was that of skimmed milk powder which was mostly exported.

However, the structure of the value of marketed production of the Polish dairy industry did not change much. The highest share in sales revenue is still that of cheese and curd (about 37%). Major commodity groups are also: processed liquid milk (18%), milk and whey powder (11%), as well as yoghurt and fermented beverages (12.5%). This structure presents how important highly processed products are to the sector. The production of high value-added products makes it possible to better use resources of factors of production and facilitates promotion on the internal market and on international markets (Szajner, 2017, p. 4).

However, the production potential of the dairy industry remains largely untapped and the production volume of practically all dairy products is limited only by the amount of available raw materials and the level of sales prices which depend primarily on world prices (Seremak-Bulge and Roman, 2016, p.p. 135-138).

**Table 2.** Production of Dairy Products ['000 tonnes]

| Item | 2004 | 2010 | 2016 | Change ratio 2016/2004 |
|---|---|---|---|---|
| Processed liquid milk | 2,080 | 2,810 | 3,345 | 160.8 |
| Fermented beverages | 469 | 723 | 702 | 149.7 |
| Skimmed milk powder | 139 | 92.8 | 163 | 117.3 |
| Curd | 296 | 267 | 449 | 151.7 |
| Ripened cheese | 219 | 371 | 329 | 150.2 |
| Processed cheese | 59 | 81 | 80 | 135.6 |
| Cream | 225 | 344 | 349 | 155.7 |
| Butter | 177 | 175 | 204 | 115.3 |
| Dried whey | 57 | 276 | 283 | 496.5 |

**Source:** Own elaboration based on Rynek Mleka, Stan i perspektywy nr 22-53, „Analizy Rynkowe", 2005-2017.

## 4. Foreign Trade in Dairy Products

The growing surplus supply of dairy products was primarily exported. This was facilitated by Poland's membership in the EU (free access to the EU market) as well as growing demand and price growth on the world market. In 2004-2016, the volume of export of dairy products increased nearly three-and-a-half fold, i.e. to 1.3 million tonnes, while its value – threefold, i.e. to EUR 1.5 billion. The growth rate of import was much higher than that of export, while its volumes were smaller than in the case of export. Import of dairy products in this period increased eighteenfold in terms of quantity to 600 thousand tonnes, while in terms of value – nearly fourteenfold to EUR 812 million. As a result, the trade balance throughout the analysed period was positive and increased to EUR 666 million, i.e. by 36%.

In 2004-2016, analysed competitiveness ratios, despite multi-directional changes which took place in this period, indicate that the competitive position of the Polish dairy industry on the international market is satisfactory. Certainly, its links with the market strengthened significantly during Poland's membership in the EU. In 2016, the export-import coverage ratio of dairy products reached 182%, the self-sufficiency ratio of the Polish dairy industry was over 118%, the share of export in marketed production of the sector increased to over 29% and the share of import in domestic consumption increased over fourfold to nearly 14% (Table 3).

**Table 3.** Foreign Trade in Dairy Products

| Item | 2004 | 2010 | 2016 | Change Ratio 2016/2004 |
|---|---|---|---|---|
| Value [EUR '000 000] | | | | |
| export | 550.2 | 1,134.9 | 1,478.3 | 268.7 |
| import | 59.3 | 369.0 | 812.2 | 1,369.6 |
| balance | 490.9 | 765.9 | 666.1 | 135.7 |
| Trade ['000 tonnes] | | | | |
| export | 382.3 | 818.3 | 1,309.9 | 342.6 |
| import | 32.6 | 230.3 | 600.1 | 1,840.8 |
| Competitiveness ratios [%] | | | | |
| – export-import coverage | 927.8 | 307.6 | 182.0 | x |
| – self-sufficiency[a] | 120.1 | 112.6 | 118.3 | x |
| – share of export in production[b] | 18.7 | 17.9 | 29.2 | x |
| – share of import in consumption[b] | 3.2 | 7.5 | 13.7 | x |

[a] self-sufficiency = production/national consumption × 100; [b] in terms of quantity (volume of export and import was calculated based on the dry matter content coefficient)

**Source:** Own calculation based on unpublished data from the Ministry of Finance.

The geographical structure of Polish foreign trade in dairy products is dominated by EU Member States which account for about 75% of export and about 95% of import of dairy products.

Prior to Poland's accession to the EU, Member States' share in the value of Polish export of dairy products was 15-20% and the share of processed products with a high share of the value added (cheese, yoghurt and milk beverages, ice cream) was only 27%. During EU membership, EU Member States' share in the value of export of dairy products from Poland increased to about 70-75%, while of highly processed final products – to about 50%. The EU's share in import was over 90%, while of highly processed products increased to 50% (Seremak-Bulge and Roman, 2016, p.p. 139-141).

The highest share in the commodity structure of export of dairy products is that of cheese and curd (about 40%), followed by milk and cream (17%), milk powder (12%), whey (9%) and butter (8%). Compared to 2004, the structure changed only slightly, in particular the share of milk powder decreased (by 26 percentage points) in favour of milk and cream and whey (up by 12 and 5 percentage points respectively). The changes in the commodity structure of export indicate that the Polish dairy industry adjusted to changes in the international market situation.

Earnings from cheese export in the analysed period increased over threefold to EUR 625 million, and from milk and cream export – nearly tenfold to almost EUR 970 million, while from whey export – sevenfold to EUR 715 million. Only earnings from milk powder sales decreased to EUR 189 million, i.e. by 8.6%.

Despite the export-oriented development of the Polish dairy industry, it is, however, worth noting that import of dairy products grew much faster than their export. The largest increase in 2004-2016 was recorded in import of milk beverages and milk and cream as well as milk powder (Table 4).

**Table 4.** Results of Foreign Trade in Dairy Products

| Item | Year | Milk and cream | Milk powder | Milk beverages | Whey | Butter | Cheese and curd |
|---|---|---|---|---|---|---|---|
| Value of export | 2004 | 28.9 | 207.1 | 35.9 | 21.0 | 66.2 | 191.1 |
| [EUR '000 000] | 2010 | 161.4 | 220.7 | 125.2 | 101.1 | 85.9 | 440.6 |
| | 2016 | 280.0 | 189.2 | 102.7 | 150.1 | 131.1 | 625.2 |
| Value of import | 2004 | 5.3 | 10.0 | 1.5 | 5.7 | 9.1 | 27.7 |
| [EUR '000 000] | 2010 | 43.7 | 79.1 | 32.1 | 22.0 | 51.2 | 140.9 |
| | 2016 | 128.0 | 232.2 | 72.7 | 30.0 | 61.8 | 287.5 |
| Balance | 2004 | 23.6 | 197.1 | 34.4 | 15.3 | 57.1 | 163.4 |
| [EUR '000 000] | 2010 | 117.7 | 141.6 | 93.1 | 79.1 | 34.7 | 299.7 |
| | 2016 | 152.0 | -43.0 | 30.0 | 120.1 | 69.3 | 337.7 |
| Export-import | 2004 | 545.3 | 2,071.0 | 2,393.3 | 368.4 | 727.5 | 689.9 |
| coverage [%] | 2010 | 369.3 | 279.0 | 390.0 | 459.5 | 167.8 | 312.7 |
| | 2016 | 218.8 | 81.5 | 141.3 | 500.3 | 212.1 | 217.5 |
| Change ratio of export | 2016/2004 | 968.9 | 91.4 | 286.1 | 714.8 | 198.0 | 327.2 |
| Change ratio of import | 2016/2004 | 2,415.1 | 2,322.0 | 4,846.7 | 526.3 | 679.1 | 1,037.9 |

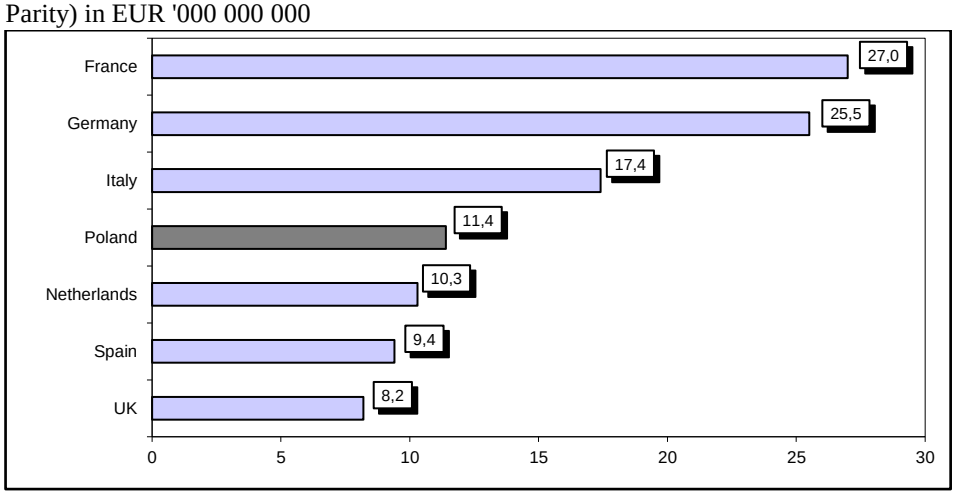
**Source**: Own calculation based on unpublished data from the Ministry of Finance.

Having analysed export-import coverage ratios of dairy products, it may be concluded that clear comparative advantages in 2016 among the analysed products were recorded with respect to export of whey (500.3%), milk and cream (218.8%), cheese and curd (217.5%), and milk beverages (212.1%). In general, the Polish dairy industry enjoys relatively high competitiveness in foreign trade in dairy products and undergoes the internationalisation process.

## 5. Development of Production in the Polish and EU Dairy Industry

Poland is a major producer of milk and dairy products in the European Union. Poland's share in EU dairy production (at comparable prices) was 8.0% in 2014 which ranked it fourth among EU Member States. Only France (18.9% of EU production), Germany (17.8%) and Italy (12.2%) were ranked higher. The Netherlands (7.2%), Spain (6.6%) and the United Kingdom (5.7%) held a lower share in EU dairy production (Figure 5).

**Figure 5.** The Largest Producers of Dairy Products in the European Union in 2014 (Value of Marketed Production at Comparable Prices, Measured by Purchasing Power Parity) in EUR '000 000 000




**Source:** Own elaboration based on Eurostat data http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en [Access: 30 June 2017]

In 2004-2014, the Polish dairy industry developed dynamically. The growth rate of dairy production in Poland – measured by the value of marketed production – was among the highest ones in the European Union. In the analysed period, the production of the Polish dairy industry (at current prices) almost doubled from EUR 3.4 billion to EUR 6.6 billion, i.e. 6.9% per year. At comparable prices, the increase was lower and amounted to 65% (from EUR 6.9 billion to EUR 11.4 billion), while the average annual growth rate was 5.1%. The largest increase in the marketed production of the dairy industry in this period was recorded in Cyprus (+200%), Lithuania (+112.5%), the Netherlands (+75%) and Denmark (+65%). In the EU-15, the production of this food industry sector increased on average by 37%, while in the EU-12/13 – by 43%. In 2004-2014, the dairy industry in Poland developed much faster than in the EU-15 (Table 5).

**Table 5.** Production of the EU Dairy Industry

| EU Member States | Value of Production [EUR '000 000 000] at | | | | Member States' Share in EU Production[a] in 2014 [%] | Ratio of changes in the value of production[a] 2014/2004 | Average Growth Rate of the Value of Production[a] [% per year] in 2004-2014 |
|---|---|---|---|---|---|---|---|
| | Current Prices | | Comparable Prices[a] | | | | |
| | 2004 | 2014 | 2004 | 2014 | | | |
| Austria | 1.7 | 2.5 | 1.6 | 2.3 | 1.6 | 143.8 | 3.7 |
| Belgium | 2.9 | 4.6 | 2.7 | 4.2 | 2.9 | 155.6 | 4.5 |
| Germany | 18.9 | 26.6 | 17.8 | 25.5 | 17.8 | 143.3 | 3.7 |
| Denmark | 3.5 | 5.8 | 2.6 | 4.3 | 3.0 | 165.4 | 5.2 |
| Spain | 7.2 | 8.4 | 8.0 | 9.4 | 6.6 | 117.5 | 1.6 |
| France | 21.8 | 29.7 | 19.4 | 27.0 | 18.9 | 139.2 | 3.4 |
| Finland | 1.8 | 2.3 | 1.5 | 1.8 | 1.3 | 120.0 | 1.8 |
| Greece | 1.4 | 1.8 | 1.7 | 2.2 | 1.5 | 129.4 | 2.6 |
| Ireland | 2.9 | 3.4 | 2.4 | 3.1 | 2.2 | 129.2 | 2.6 |
| Italy | 13.0 | 17.6 | 12.4 | 17.4 | 12.2 | 140.3 | 3.4 |
| Netherlands | 6.4 | 11.3 | 5.9 | 10.3 | 7.2 | 174.6 | 5.7 |
| Portugal | 1.4 | 1.4 | 1.6 | 1.8 | 1.3 | 112.5 | 1.2 |
| Sweden | 2.3 | 2.4 | 1.9 | 1.8 | 1.3 | 94.7 | -0.5 |
| UK | 8.1 | 9.7 | 7.3 | 8.2 | 5.7 | 112.3 | 1.2 |
| Luxembourg | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 100.0 | 0.0 |
| **Poland** | **3.4** | **6.6** | **6.9** | **11.4** | **8.0** | **165.2** | **5.1** |
| Czech Republic | 1.4 | 1.6 | 2.6 | 2.5 | 1.7 | 96.2 | -0.4 |
| Hungary | 0.9 | 0.9 | 1.5 | 1.6 | 1.1 | 106.7 | 0.6 |
| Slovakia | 0.4 | 0.6 | 0.8 | 0.9 | 0.6 | 112.5 | 1.2 |
| Slovenia | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 133.3 | 2.9 |
| Lithuania | 0.4 | 1.0 | 0.8 | 1.7 | 1.2 | 212.5 | 7.8 |
| Latvia | 0.2 | 0.4 | 0.4 | 0.6 | 0.4 | 150.0 | 4.1 |
| Estonia | 0.2 | 0.3 | 0.4 | 0.4 | 0.3 | 100.0 | 0.0 |
| Cyprus | 0.1 | 0.3 | 0.1 | 0.3 | 0.2 | 300.0 | 11.6 |
| Malta | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 66.7 | -4.0 |
| Romania | 0.4 | 0.8 | 1.1 | 1.6 | 1.1 | 145.5 | 3.8 |
| Bulgaria | 0.2 | 0.4 | 0.6 | 0.9 | 0.6 | 150.0 | 4.1 |
| Croatia | 0.4 | 0.6 | 0.6 | 1.0 | 0.7 | 166.7 | 5.2 |
| EU-15 | 93.5 | 127.7 | 87.0 | 119.5 | 83.6 | 137.4 | 3.2 |
| EU-12/13 | 8.4 | 14 | 16.4 | 23.5 | 16.4 | 143.3 | 3.7 |
| EU | 101.9 | 141.7 | 103.4 | 143.0 | 100.0 | 138.3 | 3.3 |

[a] at comparable prices, i.e. at current prices adjusted by EUR purchasing power parity in the Member States referred to above

**Source:** Own elaboration based on Eurostat data http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en [Access on: 30 June 2017]

## 6. Labour Productivity in The Polish and EU Dairy Industry

There are about 34 thousand employees in the Polish dairy industry which account for about 11% of total employment in the dairy industry of the European Union. This ranks Poland fourth among EU Member States. Higher employment is recoded only in ('000 persons): France (56), Germany (37) and Italy (35), while lower employment – e.g. in the United Kingdom (22) and Spain (19). In 2004-2014, the number of employees in the EU dairy industry was subject to changes, i.e. employment in the EU-12/13 dairy industry decreased by nearly 5%, while in the EU-15 dairy industry increased by 2.2%. At the same time in Poland, it decreased by over 20% which was reflected in a 7.5% increase in labour productivity.

**Table 6.** Labour Productivity[a] in the EU Dairy Industry in EUR '000 Per Employee

| EU Member States | 2004 | 2010 | 2014 | Change ratio 2014/2004 | Average growth rate [%] in 2004-2014 |
|---|---|---|---|---|---|
| EU-15 | 370.2 | 438.5 | 528.8 | 142.8 | 3.6 |
| EU-12/13 | 137.1 | 198.9 | 276.1 | 201.4 | 7.3 |
| EU | 303.1 | 372.6 | 459.7 | 151.7 | 4.3 |
| Netherlands | 583.2 | 771.4 | 811.0 | 139.1 | 3.4 |
| Belgium | 505.6 | 594.6 | 763.6 | 151.0 | 4.2 |
| Germany | 509.2 | 639.1 | 692.9 | 136.1 | 3.1 |
| Italy | 340.2 | 406.6 | 500.0 | 147.0 | 3.9 |
| Spain | 409.7 | 430.8 | 497.4 | 121.4 | 2.0 |
| France | 340.4 | 399.2 | 482.1 | 141.6 | 3.5 |
| UK | 274.1 | 311.6 | 371.0 | 135.4 | 3.1 |
| **Poland** | **164.8** | **248.9** | **339.3** | **205.9** | **7.5** |
| Czech Republic | 240.0 | 250.0 | 304.9 | 127.0 | 2.4 |
| Hungary | 169.7 | 194.2 | 258.1 | 152.1 | 4.3 |
| Lithuania | 80.6 | 193.0 | 239.4 | 297.0 | 11.5 |
| Romania | 67.5 | 114.6 | 146.8 | 217.5 | 8.1 |
| Bulgaria | 86.0 | 106.0 | 113.9 | 132.4 | 2.8 |

[a] at comparable prices

Source: Own elaboration based on Eurostat data http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en [Access: 30 June 2017]

Labour productivity is identified with the volume or value of production produced in a specific time by 1 employee in a given sector of the economy. It depends on numerous factors, *inter alia*: qualification and experience of employees, technical condition of machines and equipment, their modernity, labour organisation and an incentive pay system (Mroczek, 2014, p. 28). In 2004-2014, labour productivity in the dairy industry improved generally in all EU Member States and resulted

mostly from higher production value and higher expenditure on improving the capital-labour ratio. The highest increase in labour productivity in this period (at comparable prices) was recorded in Lithuania – nearly threefold (from EUR 81 thousand to EUR 240 thousand per employee), followed by Slovenia with a 122% increase (from EUR 180 thousand to EUR 400 thousand) and Romania with a 117.5% increase (from EUR 68 thousand to EUR 147 thousand per employee). In this period in Poland, labour productivity in the dairy industry more than doubled from EUR 165 thousand to EUR 340 thousand per employee, but it is still twice less than in the Netherlands (EUR 811 thousand per employee), Belgium (764) or Germany (693) (Table 6).

## 7. Concentration of Production in the Polish and EU Dairy Industry

In the Polish dairy industry in 2014, there were about 270 enterprises[3] which accounted for nearly 3% of EU dairy enterprises and ranked Poland ninth among EU Member States. In 2004-2014, their number decreased by 37% which was the largest drop among all EU Member States. Such a large decline in the number of enterprises in the Polish dairy industry was due to the ongoing restructuring and consolidation process in this sector. At the same time, the number of dairy enterprises in the EU-15 remained similar to the 2004 level, although it declined during the global economic crisis. However, the number of such enterprises in the EU-12/13 increased by nearly 15%. Among EU Member States, the largest increase in the number of active dairy enterprises in 2004-2014 was recorded in the Netherlands (by 31%) and Germany (by 24%).

[3] Including micro-enterprises.

**Table 7.** Average Value of Turnover of a Dairy Enterprise in the EU Measured by The Value of Production* Per 1 Dairy Enterprise [EUR '000 000]

| EU Member States | 2004 | 2010 | 2014 | Change ratio 2014/2004 | Average growth rate [%] in 2004-2014 |
|---|---|---|---|---|---|
| EU-15 | 10.6 | 12.9 | 15.5 | 146.2 | 3.9 |
| EU-12/13 | 8.6 | 11.6 | 14.5 | 168.6 | 5.4 |
| EU-27/28 | 10.3 | 12.7 | 15.3 | 148.5 | 4.0 |
| Germany | 80.8 | 70.8 | 93.4 | 115.6 | 1.5 |
| Netherlands | 36.8 | 39.5 | 49.0 | 133.2 | 2.9 |
| Belgium | 26.5 | 27.8 | 36.8 | 138.9 | 3.3 |
| France | 17.0 | 22.3 | 31.4 | 184.7 | 6.3 |
| UK | 21.4 | 24.3 | 23.0 | 107.5 | 0.7 |
| Spain | 6.7 | 7.5 | 7.2 | 107.5 | 0.7 |
| Italy | 3.8 | 4.9 | 5.6 | 147.4 | 4.0 |
| **Poland** | **16.2** | **29.4** | **42.2** | **260.5** | **10.0** |
| Czech Republic | 20.0 | 22.0 | 25.5 | 127.5 | 2.5 |
| Hungary | 18.0 | 13.5 | 18.2 | 101.1 | 0.1 |
| Slovakia | 22.3 | 10.6 | 13.0 | 58.3 | -5.3 |
| Lithuania | 31.9 | 44.2 | 40.5 | 127.0 | 2.4 |
| Rumania | 1.6 | 3.3 | 3.7 | 231.3 | 2.2 |
| Bulgaria | 1.5 | 3.5 | 3.5 | 233.3 | 8.1 |

* at comparable prices

**Source:** Own elaboration based on Eurostat data http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_na_ind_r2&lang=en [Access: 30 June 2017]

Having analysed the average turnover of dairy enterprises, it may be concluded that the economic strength and competitiveness of Polish producers on the European market increased. In 2004-2014, the average turnover of a dairy enterprise in Poland increased over two-and-a-half fold (from over EUR 16 million to EUR 42 million); it was 172.2% higher than the EU-15 average and 191.0% higher than the EU-12/13 average. In this respect, Poland falls behind Germany (EUR 93.4 million) and the Netherlands (EUR 49.0 million). However, the average turnover of dairy enterprises was lower, *inter alia*, in France (EUR 31.4 million), the United Kingdom (EUR 23.0 million), Spain (EUR 7.2 million) and Italy (EUR 5.6 million) (Table 7).

The concentration and consolidation process in the dairy industry is progressing throughout the European Union. In Poland, however, it is ongoing much faster than in other EU Member States. The gap between the Polish dairy industry and dairy sectors in countries with highly concentrated dairy production is thus narrowing.

## 8. Sources of the Polish Dairy Industry's Competitive Edge

The greatest market success of the Polish dairy industry following Poland's accession to the European Union was the dynamic growth of export and the

strengthening of the position of Polish producers on the EU market (in terms of revealed comparative advantages). The enterprises responded very positively to new trading conditions, in particular to free access to the large market characterised by high prices and high consumer purchasing power. They welcomed the EU market regulation system which helped stabilise prices and processing conditions. Many enterprises found it a major investment challenge to conduct adjustment processes, but most of them succeeded. They also successfully coped with high competition from foreign enterprises on both the domestic market and international markets.

In the first period of Poland's membership in the EU, lower prices of products were the primary factor in building the competitive edge of Polish dairy enterprises. Over time, however, their edge started declining and it became increasingly obvious for producers that other sources of the competitive edge would gain in importance, such as: quality and health safety of products, quality of raw materials (raw milk offered for buying-in), innovativeness and assortment of products, promotion and advertising, traditional technologies, access to information, digitisation, etc. The continuation of restructuring processes presented also large potential for improving the effectiveness of processing and trade in the dairy sector. In fact, the scale-up of milk production and processing makes it possible to derive greater benefits from the economies of scale and the value added, and thus to make better use of resources of factors of production (thereby increasing the share of capital employed and diminishing the importance of labour costs).

Polish dairy enterprises have hitherto sold their products on foreign markets on their own thanks to a favourable price-to-quality ratio of products. As mentioned, however, this cost-price competitive edge of Polish producers is gradually declining. Exporters should therefore consider trading through a system of agri-food exchanges (basically, such a system in Poland would need to be established from scratch), since world trade in agricultural raw materials and foodstuffs is pursued in no other way than through stock exchanges. Obviously, Polish producers will thus have to create joint sales groups and produce uniform standardised batches of products, but it is worthwhile, as these projects may have a positive impact on the further development of Polish export of dairy products.

This activity will also require more active promotion on external markets. Due to high promotion costs and the relatively low economic potential of most domestic enterprises, it seems justified to apply a promotion strategy which would cover at least a group of dairy operators, if not the entire dairy sector. Promotional activities should lead to increasing the share of Poland-specific products in export which would be offered under brands of domestic producers. Given the highly fragmented Polish dairy industry and difficulties in selling large batches of products by producers, it may be crucial to developing the sector and making it more competitive.

## 9. Summary

Poland's economic transformation and accession to the European Union in 2004 as well as related reforms triggered the accelerated development of the dairy industry, thus making it one of the most modern industries in Europe. It could thus present an attractive offer of good quality dairy products at acceptable prices to consumers and compete effectively on international markets. Processes of adjustment to the market economy were facilitated by the price policy of dairy establishments which rewarded high milk quality and progressive delivery concentration. The removal of barriers to intra-EU trade and free access to the market of Member States were crucial to the intensification of investment and the development of modernisation processes in the dairy sector which led to export development, price growth as well as improved milk production and processing effectiveness in Poland.

Thirteen years after accession to the European Union, the dairy industry in Poland stands out from other EU Member States. Poland is the EU's fourth largest producer of dairy products with a share of 8% in EU dairy production. In 2004-2014, the value of marketed production of the Polish dairy industry (at comparable prices) increased by 65% (EUR 11.4 billion in 2014), while in the EU-15 – by 46% (EUR 119.5 billion), and in the EU-12/13 – by 83% (EUR 23.5 billion). At the same time, labour productivity in the Polish dairy industry more than doubled. Although it is still much lower than in highly developed EU Member States with the highest dairy production, the gap is narrowing each year.

The Polish dairy industry has successfully competed on the EU food market so far, but its confrontation with foreign competitors on the market will require Polish producers to take dynamic actions to find new sources of their competitive edge.

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