

AgriPolicy
Enlargement Network for Agripolicy Analysis

**ASSESSMENT OF THE COMPETITIVENESS OF THE
DAIRY FOOD CHAIN
IN POLAND**

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The project aims to establish a network of experts involved in agricultural policy analysis and rural development in the 12 New Member States, and in the 8 Candidate and Potential Candidate Countries. More information on the project can be found at www.agripolicy.net .

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1 Introduction

The dairy sector plays a significant role in the Polish economy. Milk is one of the most important agricultural products, accounting for 15.6% of total agricultural production and for 18.6% of market output in 2007. Only pork production represent a higher share of market output. Milk production remains a major source of income and food for approx. 656,000 agricultural holdings. According to household budget surveys, dairy produce accounts for ca. 15% of food expenditure. In farming families subsistence production represents 78% of the consumption of drinking milk, whereas the respective proportion for cream is 69% and 52% for curd.

The dairy industry accounts for 14.8% of the sold production of the food processing industry and for 11.8% of employment. The dairy industry is a net exporter, with export surplus of ca. EUR 860 million in 2007. After accession, its share in agri-food exports and imports increased to 12% and 3% respectively.

2 Overview of the sector

2.1 Sector definition: sector components and importance

The dairy sector covers milk production in agriculture and milk processing in the dairy industry.

At the level of agriculture, the main product of the sector is cow milk containing 3.5% to 4% of fat and 2.8% to 4% of protein. “By-products” (additional production) include live cattle/cattle for slaughter as dairy farms also sell calves, young cattle for fattening and cull dairy cows. Furthermore, agricultural holdings produce and directly sell simple dairy products such as drinking milk, cream, curd and, to a lesser extent, butter.

The milk processing industry covers the following activities:

- collecting and preparing milk for further processing;
- the manufacture of dairy products for human consumption including packaging;
- the manufacture of products (milk powder and whey powder , butter, cream) representing materials for secondary food processing (e.g. in the confectionery and baking industries) and in the manufacture of animal feeds.

In the NACE Classification milk processing is classified under headings **15.51 – operation of dairies and cheese making** and **15.52 – manufacture of ice cream**.

Dairies (15.51) also pursue additional activities:

- supplying farms with agricultural inputs: breeding heifers of dairy breeds, equipment for milking and cooling milk, to a lesser extent – animal feeds;
- milk services provide consulting and advisory services with regard to milk production technology;
- wholesale and retail trade in dairy products in the domestic market;
- foreign trade in dairy products, mostly own output.

Poland ranks among major producers of milk and milk products in the world and in the EU. Poland's share in the global and EU milk output is 2% and 8.5%. The Polish share in the world production of cheese, butter and milk powder ranges from 2% to 3.5%. Poland's dairy sector plays a minor role in world trade (ca. 1% in terms of value), with the exception of exports of milk powder, accounting for approx. 4% of world exports.

2.1.1 Production and value added

Since 1998, milk production in Poland has been rather stable at ca. 12 million tonnes. It results from the fact that a fall in the number of dairy cows has been compensated by rising milk yield, mostly in development-oriented farms. In 2000-2006 the total milk output was EUR 2.0-2.8 billion, i.e. 15% to 17% of total agricultural production. At the same time, market output of milk went up from EUR 1.6 billion to EUR 2.2 billion, approx. 19% of total market output in agriculture (Tab. 1). Commercial agricultural production was driven by growing deliveries of milk to dairies as well as by high collecting prices after Poland's accession to the EU. In 2007, as a result of very favourable prices in the world and in the EU, collecting prices of milk showed a marked increase, pushing up total production to EUR 3.4 billion, and market output to EUR 2.6 billion. Due to high prices for other agricultural products (e.g. cereals), the share of milk in total agricultural production remained unchanged. Between 2000 and 2007, total sales of the Polish dairy industry jumped nearly by 80%, to EUR 6 billion. It resulted from the growing collection of milk (up to the milk quota) and rising selling prices after Poland's integration into the EU. On account of limited demand in the domestic market, sales were fuelled by export expansion, primarily to EU markets. The share of the dairy sector in total sales of the food industry is 14.5-15.5%. The dairy industry is characterised by rather low value added (16% to 18% of sales). It stems from a relatively high share of low-processed products in sold production (e.g. drinking milk, cream, milk powder and whey powder, curd). In the food industry value added represents an average of 22% to 25% of sales, whereas the highest share of 30% to 40% is found in the manufacture of sugar confectionery, sugar and beer. As a consequence, the share of the dairy sector in the value added of the food industry remains rather limited, at an average of ca. 11% (Tab. 2).

Table 1. Share of milk production in Gross Agriculture Output (GAO), [Mio. EUR, %]

Specification	1995	2000	2001	2002	2003	2004	2005	2006	2007
Gross Agriculture Output	13828	13958	16443	14448	12794	15259	15732	16706	21612
Milk production	1629	2315	2534	2222	1967	2234	2688	2802	3372
Share in GAO	11.8	16.6	15.4	15.4	15.4	14.6	17.1	16.8	15.6
Market Agriculture Output	6926	8350	9795	9010	8309	10113	10684	11730	13902
Milk production	1118	1565	1837	1637	1484	1721	2105	2203	2586
Share in GAO	16.1	18.7	18.8	18.2	17.9	17.0	19.7	18.8	18.6

Source: "Rocznik Statystyczny Rolnictwa", "Rocznik Statystyczny", GUS

Table 2. Share of milk production in total Gross Value Added (GVA), [Mio. EUR, %]

Specification	1995	2000	2001	2002	2003	2004	2005	2006	2007
Total turnover in the food industry	12864	21410	25861	25094	23590	26554	30888	34199	40446
Turnover in the dairy industry	1891	3310	3831	3577	2768	3906	4696	4252	5980
Share in turnover	14.7	15.5	14.8	14.3	11.7	14.7	15.2	12.4	14.8
Value added in the food industry	3023	4817	5301	4994	4718	6427	7315	7904	9642
Gross value added in the dairy industry	318	573	667	640	501	676	742	668	993
Share in GVA	10.5	11.9	12.6	12.8	10.6	10.5	10.1	8.4	10.3

Source: Own study, unpublished GUS data.

2.1.2 Product flows within the sector

In Poland milk production is characterised by a relatively low share of market output in total production as a significant share of milk output continues to be consumed on farms. In 2007 milk production was 12 million tonnes, 9 million of which represented deliveries to dairies and 0.5 million tonnes were sold directly to consumers. As a result, the share of sales in total output was 79%, much lower than in the EU-15, where it ranged between 93% to 97%.

In small agricultural holdings with one or two dairy cows a major share of output is production for own consumption, direct sales and animal feeds. In 2007 milk consumption on farms was 2 million tonnes, whereas approx. 0.5 million tonnes was used for animal feed.

Milk distribution is characterised by significant regional differences. Limited collection of milk is mostly observed in southern and eastern Poland where agriculture is rather fragmented. At the same time, in north-eastern and north-western regions the share of sales approximates 90%.

2.2 Structural features of the dairy supply chain: present situation and trends over time

2.2.1 Industry structure at primary level

Milk production in Polish agriculture is characterised by considerable fragmentation of dairy farms, despite the favourable changes observed in 1996-2007. The number of agricultural holdings with cows dropped by 51% to 656,300, of which 285,000 farms have milk quotas. In the marketing year 2004/2005, 387,000 holdings had milk quotas, i.e. the number of suppliers for the industry decreased by approx. 26%.

The structure of dairy farms is dominated (88%) by holdings with 1 to 9 cows, very infrequent in the EU-15 (Tab. 3). It should be emphasised that this group mostly includes farms with 1 to 2 cows, producing exclusively for own consumption or limited direct sales. Large family farms and agricultural companies represent a small share of the total number of dairy farms, but they account for a very high proportion of output. It is confirmed by changes in the structure of dairy cattle farming depending on the scale. In 1996, agricultural holdings with 1 to 9 cows accounted for nearly for 90% of the total number of dairy cows in Poland. In 2007, cows from the smallest farms only represented 44%. There was a marked increase in the number of cows in large holdings, oriented towards the dairy industry (Fig. 1).

Structural changes in milk production continue to be too slow, which is determined by limited production factors, i.e. mostly land and capital. Small and medium farms are characterised with small economic capacity. The investments aimed at enlargement of farms are linked with significant costs of land purchase, which prices considerably increased after the accession. Comparing to other countries of the EU-15 land tenancy in Poland is not very popular. Moreover, the large number of small farms means fragmentation of property rights. Thus, the expansion of a farm implies the purchase of land belonging to other farms, which would have to withdraw from the business. Milk production is also capital intensive (purchases of animals and fixed assets). Majority of Polish farms can have serious problems with acquiring external capital to finance such investments. The only opportunity here seems to be the money out of support programmes (including the EU programmes), which would facilitate investments.

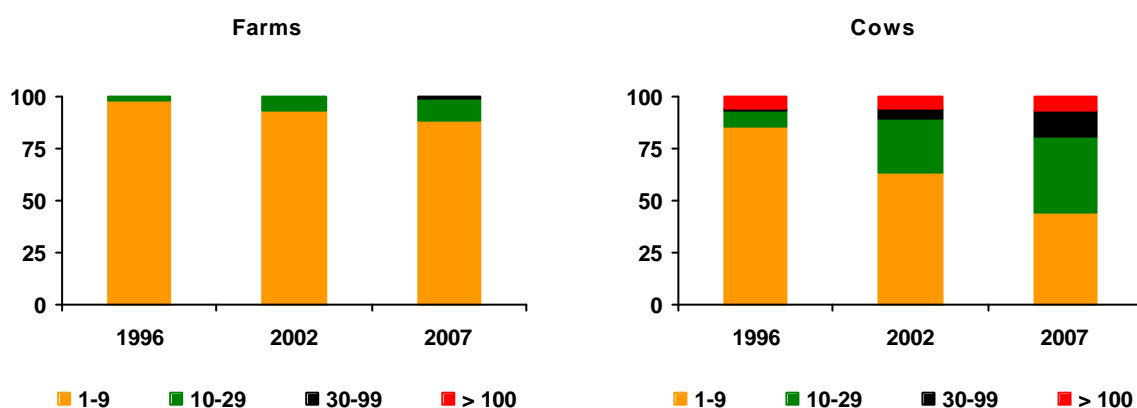
Labor is abundant in Polish agriculture, with labor surplus found in many agricultural holdings. Land fragmentation has an adverse effect on the competitiveness and efficiency of milk production as it reduces the benefits of lower production costs, mainly wages/labour costs.

Table 3. Livestock farms by size in 2007

Specification	Farms		Cows		
	'000	%	'000	%	Average head/farm
Total	656.3	100.0	2787.0	100.0	4.2
1-9 heads	579.9	88.4	1220.7	43.8	2.1
10-29 heads	67.2	10.2	1042.3	37.4	15.5
30-99 heads	8.5	1.3	348.4	12.5	40.8
> 100 heads	0.7	0.1	175.6	6.3	257.9

Source: Own study, GUS data, "Charakterystyka gospodarstw rolnych w 2007 roku".

Figure 1. Livestock farms by size in 2007



Source: Own study, GUS data, 1996 and 2002 agricultural censuses, "Charakterystyka gospodarstw rolnych w 2007 roku".

2.2.2 Industry structure at processing level

The Polish dairy industry has been undergoing comprehensive restructuring and modernisation which still continues. Restructuring covered both structural and ownership changes. At the same time, there has been a decline in the number of agricultural holdings and increasing land concentration as well as the transformation of cooperatives into private units, also foreign-owned entities. The number of plants in the sector went down from ca. 400 in 1993 to 230 in 2007. Between 2003 and 2007, the average output per milk processing plant rose nearly by 40% to 37,000 tonnes and again reached the 1988 level. The growth in output per processing plant stemmed from a reduced number of units and increased milk collection (to the level of the milk quota). Despite such positive changes, the dairy industry in Poland continues to be fragmented in comparison with the EU-15. In Germany the average dairy processes ca. 120,000 tonnes of milk, i.e. almost triple the figure for Poland.

Broken down by size, enterprises with 50 to 249 employees represent a predominant share, 56% of the total number of establishments. Large dairies with more than 250 persons employed account for approx. 10% of plants. However, such companies generate 53% of total

sales in the sector and represent 43% of total employment. The share of small businesses in sales and employment is 9% and 11% respectively (Tab. 4, Fig. 2).

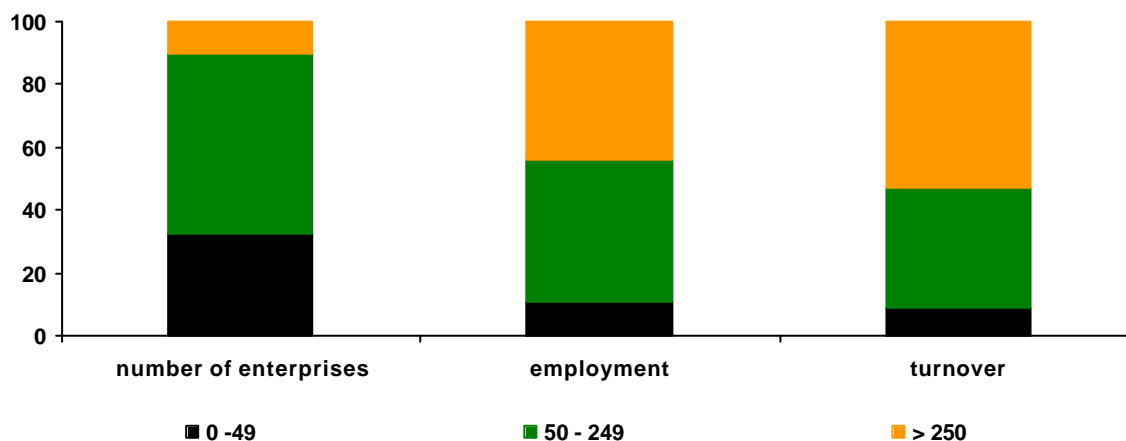
The stock of foreign direct investment in the Polish dairy sector is rather limited, a total of approx. USD 550 million in 2005. Nevertheless, such investment has had a significant impact on ownership changes and modernisation in the sector as well as increasing competition in the market. As a result, private companies have expanded their market share, whereas a number of private firms are leaders in specific market segments (yoghurts and milk-based beverages, processed cheese). But the market leaders continue to be two large capital groups operating as cooperatives where farmers are the shareholders/members. The dairy industry is the only sector in food processing where cooperatives account for a major market share (Tab. 5).

Table 4. Enterprises in the dairy industry (NACE 15.51) by size

Size class [number of employees]	Number of Enterprises
0-49	76
50-249	132
>250	24
Total	232

Source: Own study, unpublished GUS data.

Figure 2. Structure of the dairy industry (NACE 15.51)



Source: Own study, unpublished GUS data.

Table 5. List of large dairies in 2007

Name of company	Ownership	Collection		Turnover		Employment	
		Mio. L	%of total	Mio. EUR	% of total		%of total
Mlekpól	Co-operative	860	10.3	390	6.5	1634	4.1
Mlekowita	Co-operative	750	8.9	345	5.8	1289	3.2
Danone Polska	Ltd.	214	2.6	297	5.0	1315	3.3
Hochland Polska	Ltd.	210	2.5	145	2.4	817	2.0
Zott Polska	Ltd.	105	1.3	143	2.4	320	0.8

Source: Own study, unpublished GUS data, "Lista 2000" – Rzeczpospolita.

2.3 Production, consumption and trade developments

As a result of restructuring and modernisation of enterprises, there have been positive changes in the production of dairy products. Investment made by processing plants allowed to significantly increase the output of yoghurts and milk-based beverages, ripened cheese and processed cheese. The development of cheese making has pushed up the output of whey powder. In the long term, however, there has been a fall in the production of skimmed and whole milk powder and butter. There have been minor changes in the production of liquid milk and cream (Tab. 6). The modernisation of the sector is also reflected in changes in the structure of commercial output. In 2007 the structure of production was dominated by high value added products: cheese and curd – 36%, yoghurts, milk-based beverages and ice cream – 17%. In 1990 the share of those products was 20% and 3% respectively. A significant role was then played by butter (27%), liquid milk and cream (26%) and milk powder (17%). Similar developments have been observed in the structure of use of milk fat. This is a favourable trend as the production structure has been increasingly similar to that characteristic of the German dairy sector. A growing share of highly processed products in output results in greater value added and facilitates sector promotion.

Table 6. Trends in dairy production

Specification	1990	1995	2000	2004	2005	2006	2007
Butter ['000]	290	123	139	177	179	173	172
Hard Cheese ['000]	130	122	148	219	239	257	258
Curd ['000]	295	198	262	296	295	302	323
Skimmed Milk Powder ['000]	176	128	128	139	142	127	125
Whole Milk Powder ['000]	50	41	30	34	50	37	28
Yoghurt, milk-based beverages [Mio. L]	-	150	345	469	510	558	589
Fresh milk [Mio. L]	2037	1260	1363	2080	2294	2293	2283
Cream [Mio. L]	335	175	198	270	313	343	342

Source: Own study, unpublished GUS data.

In 1989, the Polish dairy industry processed 11.8 million tonnes of milk, whereas the processing capacity was 12.9 million tonnes, i.e. the average capacity utilisation rate was 90%. At present, the dairy industry processes approx. 9 million tonnes of milk, with processing capacity at 12 million tonnes and utilised at 75%. Such processing potential reserves are typical of the market economy and necessary to flexibly respond to changes in demand. However, surplus production capacity in a major share of processing plants seems excessive, which impedes optimum use of production factors.

For years milk consumption in Poland has been limited. In 1990, milk consumption *per capita* was 330 kg. During economic transition and EU accession it went down to 254 kg, being much lower than in the EU-15 (Tab. 7). Before integration, decreasing consumption resulted from a difficult situation in the labour market and compromised income of households. Poland's accession to the European Union triggered a dramatic rise in retail prices, which was determined by the inclusion of the Polish dairy sector in the EU system of market regulation and significant exports to the EU. In 2007 there was a marked increase in world prices, also reflected in the domestic market. Structural changes in agriculture have also contributed to a fall in consumption. The number of farms with cows has been decreasing, therefore subsistence production has diminished in importance to farming families. Changing nutrition patterns also play a significant role. Due to the rapid development of production of

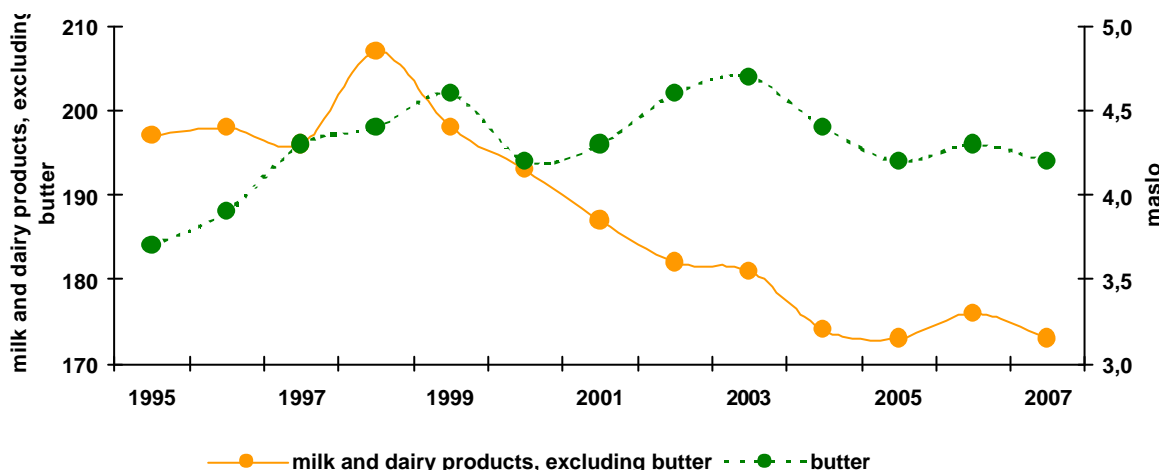
hydrogenated vegetable oils, consumers have a wider choice of substitutes (e.g. margarine). The above-mentioned trends combined result in the continuing low consumption of milk and promotion programmes (such as aid for milk consumption in educational establishments) have only had little effect. The structure of consumption of dairy products has been changing. The consumption of liquid milk has been declining, whereas that of yoghurts and milk-based beverages has been growing. There has been a rise in the consumption of ripened and processed cheese. The consumption of butter, cream and curd showed minor changes in 2000 and 2007 (Tab. 8, Fig. 3).

Table 7. Consumption of main dairy products, [kg, L per capita]

Specification	1990	1995	2000	2004	2005	2006	2007
Butter	7,9	3,6	3,8	4,3	4,1	4,2	4,0
Hard cheese	3,0	2,9	3,5	4,1	4,2	4,3	4,4
Curd	7,3	6,8	6,5	6,4	6,2	6,2	6,2
Fresh milk	98,9	82,0	64,7	55,1	53,2	49,4	46,1
Yoghurt, milk drink	1,8	2,4	3,9	4,2	4,1	4,4	4,8
Cream	7,3	6,5	5,5	5,3	5,2	4,9	4,8

Source: Dane GUS

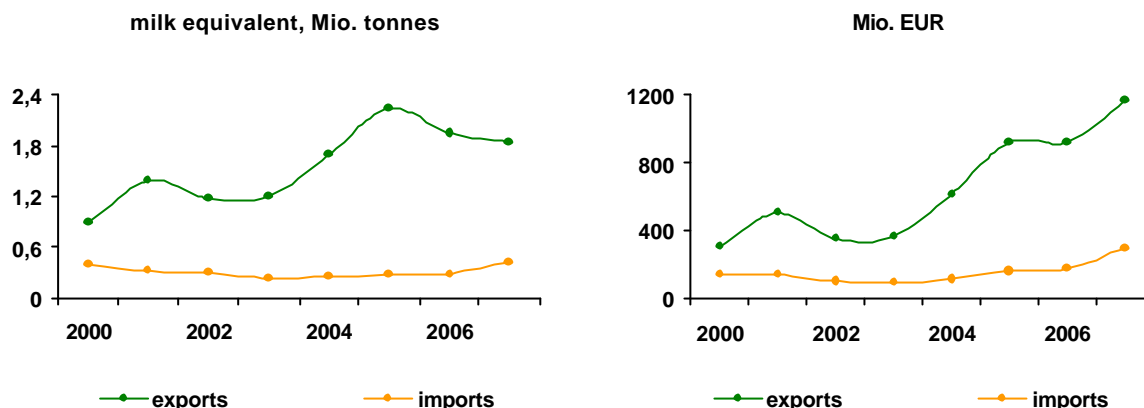
Figure 3. Consumption of dairy products, [kg, L per capita]



Source: GUS data.

For years the Polish dairy sector has been a net exporter. After the EU accession there was significant export expansion, due to falling demand in the domestic market and free access to the Community market, characterised by high prices. In 2007, exports reached 1.8 million tonnes in milk equivalent, worth nearly EUR 1,166 million (Fig. 4, Tab 9). Exports play a vital role in the sector as they account for 21% of milk collection and approx. 20% of total sales. Changes in the production of dairy products were also reflected in exports. There was a significant rise in exports of cheese and curd, butter, yoghurts and milk-based beverages. Exports of milk powder was characterised by marked fluctuations, but with no clear upward or downward trend. In terms of value, the main export products included cheese and curd (37%), milk powder and whey powder (29%), liquid milk and cream (12%), yoghurts (9%) and butter (8%).

Figure 4. Exports and imports of dairy products



Source: Own study, GUS, CAAC, CIHZ.

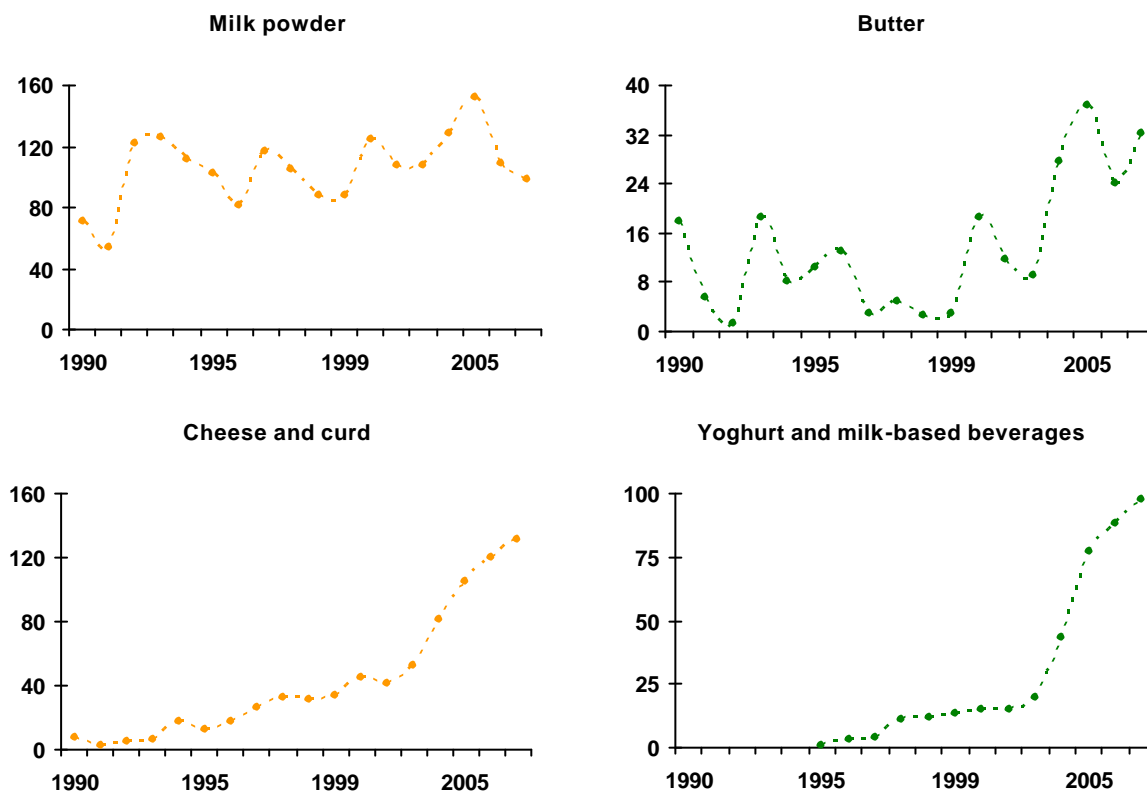
Table 8. Exports and imports of main dairy products

Specification	1990	1995	2000	2004	2005	2006	2007
Exports ['000 tonnes]							
Butter ['000]	17.8	10.5	3.0	27.6	36.8	24.1	32.1
Cheese and curd['000]	7.3	13.1	33.7	81.2	104.5	120.6	131.5
Milk Powder ['000]	71.3	101.7	87.6	129.0	152.3	109.0	99.0
Yoghurt, milk-based beverages [Mio. L]	-	1.0	15.0	43.7	77.2	88.1	97.7
Imports ['000 tonnes]							
Butter ['000]	4.2	0.3	12.3	4.1	3.6	4.7	6.7
Cheese and curd['000]	0.4	8.2	6.7	8.6	14.8	18.7	26.8
Milk Powder ['000]	-	3.8	18.8	5.9	8.2	7.2	16.8
Yoghurt, milk-based beverages [Mio. L]	-	3.1	26.9	1.9	4.3	11.6	35.7

Source: Own study, GUS, CAAC, CIHZ.

Despite free trade in dairy products with EU Member States, dairy imports remain limited (approx. EUR 300 million) and only supplement market supply. This is largely due to low disposable income, which determines consumer preferences. As a result, expensive quality cheese from Western Europe appeals to few consumers in the domestic market. A similar situation is observed in the case of butter, yoghurts and milk-based beverages (Tab. 9, Fig 5-6). In the geographical structure of Polish foreign trade EU Member States play a prominent role, on account of free market access and high export prices. In 2007 the share of the EU-27 in the value of exports and imports was 76% and 84% respectively. It is confirmed by high trade concentration by country (Tab. 10).

Figure 5. Exports of dairy products ['000 tonnes]



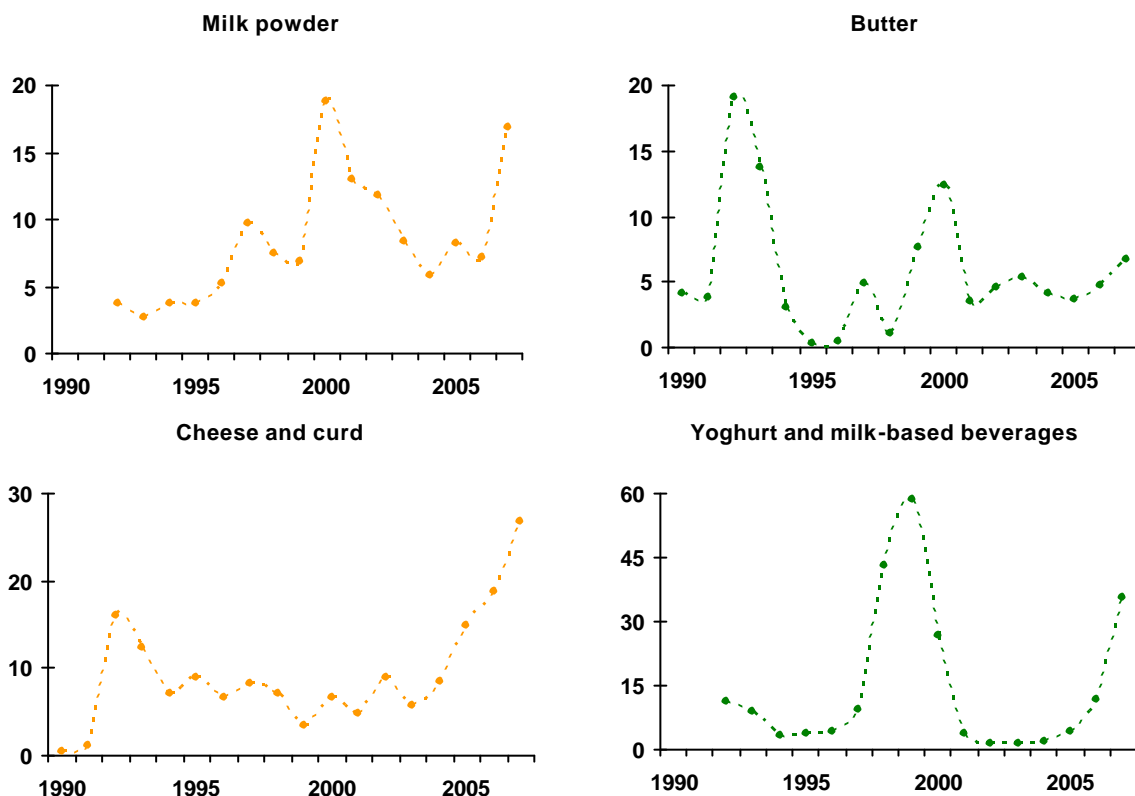
Source: Own study, GUS, CAAC, CIHZ.

Table 9. Geographical structure of foreign trade

1995		2000		2007	
Exports in%					
Share of 5 main	70.1	Share of 5 main	50.8	Share of 5 main	51.8
Netherlands	32.2	Mexico	16.4	Germany	23.8
Russia	11.2	Algeria	14.1	Netherlands	8.4
USA	10.9	Netherlands	7.2	Czech Republic	7.3
Germany	8.4	USA	7.0	Italy	6.8
Vietnam	7.3	Czech Republic	6.2	Algeria	5.5
Share of 10 main	86.3	Share of 10 main	69.9	Share of 10 main	69.7
Share of 20 main	96.0	Share of 20 main	86.6	Share of 20 main	85.9
Imports in % of total value					
Share of 5 main	76.9	Share of 5 main	76.9	Share of 5 main	66.1
Germany cy	37.4	Germany	21.8	Germany	33.5
Russia	21.1	Russia	20.7	Lithuania	9.1
Ukraine	10.7	Ukraine	14.4	Belarus	8.7
Czech Republic	6.4	Czech Republic	12.2	France	8.1
France	3.9	France	7.8	Czech Republic	6.7
Share of 10 main	92.7	Share of 10 main	92.7	Share of 10 main	85.0
Share of 20 main	99.0	Share of 20 main	99.0	Share of 20 main	97.8

Source: Own calculations, data of CIHZ, CAAC.

Figure 6. Imports of dairy products [‘000 tonnes]



Source: Own study, GUS, CAAC, CIHZ.

2.4 Government policy

2.4.1 Regulatory framework of the dairy sector

As a result of the integration into the EU, since 2004 the domestic market in milk and dairy products has been included in the EU regulatory framework. The system is based on milk quotas which guarantee efficiency and high performance of other instruments of market regulation. In addition to milk quotas, the market regulation system includes the following support measures:

- stabilisation of the internal market: intervention buying-in (intervention prices) and aid for private storage of specific products;
- stimulation of internal demand: subsidies for milk fat used in the processing industry and for human consumption, aid for skimmed milk powder (SMP) used in animal feed, aid for SMP processed into casein and caseinates, subsidies for milk consumption in educational establishments;
- foreign trade in dairy products, mostly own output: trade control through export and import licenses as well as export refunds consistent with WTO commitments.

During accession negotiations Poland obtained the following milk quota: 8,946,017 tonnes – deliveries for the dairy industry, 464,017 tonnes – direct sales, and 416,000 tonnes – the

restructuring reserve available from 2006. As a result, the milk quota totalled 9,380,143 tonnes, which is assessed as low. Poland was granted 65% of the requested milk quota, whereas other Central and Eastern European countries obtained approx. 75% of the quotas requested. The situation is further aggravated by the low reference fat content (3.90%), whereas the actual figure is 3.98%. In the marketing year 2004/2005, the milk quota was exceeded by ca. 280,000 tonnes and farmers had to pay penalty charges. In subsequent years, in fear of further penalty charges, producers have been careful not to exceed the quota. Therefore, it proved to be an effective barrier to the expansion of production and to improved production capacity utilisation. The milk quota is much lower than output (12 million tonnes) and milk consumption of approx. 10 million tonnes.

In the marketing year 2008/2009 the production quota increases by 2%, and by 2015 it will rise by a total of 7% to reach the target of 10,056,000 tonnes. This pattern is seen as a positive development since it will enable many farms to expand production. However, the growth rate of the milk quota seems insufficient as it will continue to be a barrier to structural changes in agriculture. The purchase or lease of the quota and penalty charges represent additional costs for agricultural holdings, thus reducing production profitability. The milk quota also determines low capacity utilisation in the dairy industry. Both farms and dairies cannot fully benefit from the economies of scale or value added.

The year 2007 witnessed a significant rise in world prices for dairy products. Prices for skimmed milk powder went up to a record high of EUR 3,285 per tonne, i.e. markedly above the EU intervention price of EUR 1,747 per tonne. A similar situation was observed in the market for butter, world prices of which increased to EUR 2,560 per tonne and also exceeded the EU intervention price of EUR 2,464 per tonne. The favourable conditions in the world market was reflected in the EU market as significant export demand and a price rise. As a consequence, the EU set the applicable export refund at a zero rate and paid no export support. This was also the case with all the instruments for stabilising the internal market. In Poland the regulatory framework in the food market is supervised by the Agricultural Market Agency. In 2007 the Agency only implemented measures aimed to stimulate domestic demand in the form aid for milk consumption in educational establishments. Payments on 55,000 tonnes of milk and dairy products totalled PLN 69 million. The programme benefited 1.8 million pupils of 9,800 schools.

The agricultural policy for the sector also covers support for the restructuring process with funds from the national and EU budgets. Prior to EU accession, payments on preferential loans and aid for the production of the premium class milk (*ekstra*) played a significant role in agricultural holdings, at PLN 540 million in 2003. Between 2004 and 2006 farms also benefited from the EU support programs: SAPARD (PLN 81 million), the Sectoral Operational Program - SOP (PLN 365 million) and Rural Developed Plan - PROW (PLN 140 million).

The dairy industry received financial assistance under the SAPARD programme (PLN 405 million) and the SOP (PLN 536 million). In the years preceding the EU accession, dairies benefited from preferential loans. Between 1994 and 2006, total investment support for the dairy industry was PLN 1,130 million, 65% of which represent EU funds.

The modernisation and restructuring of the dairy sector, at both agriculture and industry level, have not been completed yet and will need further support. In 2007-2013, the available EU appropriations should be utilised as efficiently as possible by individual units, which will

stimulate changes and improve the competitive position. A vital role would be played by policy liberalisation with regard to milk quotas, but they are likely to be maintained until 2015.

2.4.2 Other dairy sector relevant policy areas e.g. environment policies, competition policy etc.

Policies within the dairy sector also concerns other economic aspects such as health concerns, environment protection and fighting with unfair competition. All dairy farms and processing plants have to comply with the EU law veterinary standards. During the accession negotiations Poland was granted with a transition period (derogation from the EU law). So all market players have to fulfil the requirements by the end of 2006. Intensive adjustment processes had already started in 2002 with huge investments. The investments conducted over the period of 2002-2006 resulted in the fact that presently all processing plants obey the EU standards. The importance of health concerns and quality management are well mirrored by the strong interests of milk processors in implementation of Good Hygienic Practice (GHP), Good Manufacturing Practice (GMP), Hazard Analysis and Critical Control Point (HACCP) i ISO.

Milk processors as well as dairy farms are obliged to obey certain environmental requirements. In the case of milk processors the requirements concern mainly reduction of gases emission and modernisation of sewage systems. The investments conducted in these enterprises lead to a significant improvement in the are of environment protection. The majority of the enterprises has modernised energy supply and sewage systems. For instance the manufacturers of ripening cheese, which invested in new technological lines in order to utilise whey (for whey powder). Dairy farms also aligned to the requirements of environment protection, in particular through a reduction of liquid wastes. Modernisation of milk sheds, isolated places for manure and liquid manure has a positive impact on the condition of ground water. The dairy processors, similarly to any other economic entities are subject to the law on illegal competition. The policies in this regard precisely regulates these maters through the Office of Competition and Consumer Protection.

3 Performance of the dairy supply chain

3.1 Performance at farm level

3.1.1 Yields

The ongoing restructuring of the raw material base of the Polish dairy industry is well reflected in the milk yield of cows. Between 1990 and 2007, the milk yield per cow went up by 35% to 4,000 kg, but it remains much below the EU-15 average, i.e. more than 6,500 kg. The low average milk yield is determined by a large number of agricultural holdings with 1 to 2 cows. In recent years, farms have become increasingly interested in controlling milk performance/yields of cows. In 2007 the number of cows under control was 590,000, which accounted for 19% of domestic livestock. The average milk yield in such farms was 6,690 kg, roughly the same as in the EU-15 (Tab11-12, Fig. 8).

Table 10. Number of cows, average herd size and milk yield in 2006

Country	Dairy Cows ['000]	Average Herd Size	Average Milk Yield [kg]
Poland	2787	4.2	4326
Czech Republic	426	62.6	6542
Germany	4117	37.3	6849
France	3895	37.5	6084
Netherlands	1463	62.3	7713

* Poland – 2007.

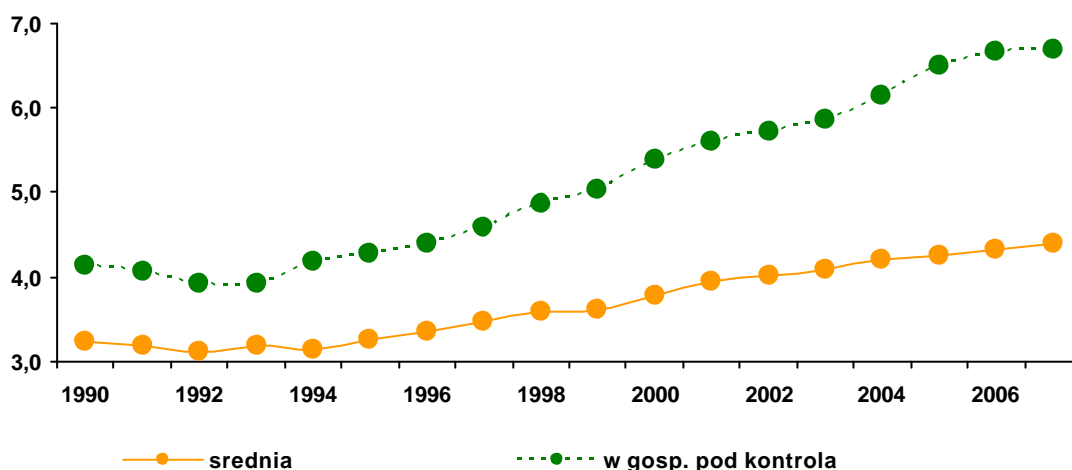
Source: GUS data, "Milch. Marktbilanz", ZMP GmbH, Bonn, 2007.

Table 11. Changes in milk yield [kg, per cow]

Specification	1990	1995	2000	2004	2005	2006	2007
Poland	3246	3255	3778	4205	4271	4326	4400
Czech Republic	3827	4302	5413	6168	6423	6542	-
Germany	4710	5400	6110	6585	6761	6849	-
France	4895	5670	5660	5930	6104	6084	-
Netherlands	6084	6420	7214	7415	7568	7713	-

Source: "Milch. Marktbilanz", ZMP GmbH, Bonn, 1996, 2002, 2007.

Figure 7. Changes in milk yield [kg, per cow]



Source: GUS data, Krajowe Centrum Hodowli Zwierząt, Polska Federacja Hodowców Bydła i Producentów Mleka.

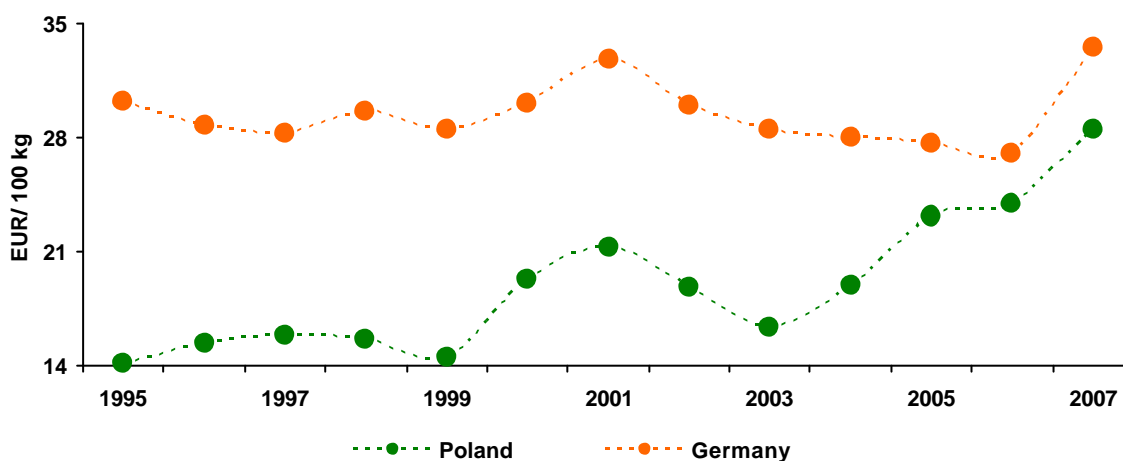
Genetic improvements and its transmission to production is done in two ways: the purchase of breeding heifers of dairy breeds and the insemination of cows by breeding bulls of dairy breeds. Only a minor role in genetic improvement of dairy cattle is played by imports. Between 2001 and 2007, Polish imports of breeding heifers and cows totalled 96,500, i.e. an annual average of approx. 12,000, which is rather insignificant relative to the number of domestic cows.

There are considerable regional differences in milk yield of cows. The highest yields are recorded in western Poland (more than 5,000), whereas the lowest – in south-eastern regions (less than 4,400 kg).

3.1.2 Prices

For years the Polish dairy industry has based its competitive advantages largely on lower milk prices. Between 1995 and 2003, milk collection prices in Poland were 45% to 55% lower than in Germany, one of the main competitors and outlets for dairy products. After Poland's accession to the European Union, the price gap narrowed significantly, from 30% in 2004 to 11% in 2006. It stemmed from different development trends in the markets in question. As a result of the CAP reform, collection prices in Germany dropped to EUR 26.96 per 100 kg, whereas in Poland they went up to EUR 23.94 per 100 kg after accession. In 2007 there was a considerable increase in collection prices for milk, both in Poland (EUR 28.5 per 100kg) and in Germany (EUR 33.5 per 100 kg). However, domestic prices continued to be only 15% lower, which indicates that price fluctuations did not significantly affect competitiveness (Fig. 8). The factor to have a downward effect on price competitiveness was the appreciation of the zloty against the euro.

Figure 8. Milk prices [EUR/100 kg]



Source: Own calculations, GUS and NBP data.

3.1.3 Gross margins

The Institute of Agricultural and Food Economics – National Research Institute conducts surveys on production costs and profitability of specific agricultural products. An analysis of the profitability of milk production has demonstrated that in 2006 the average gross margin in the group of farms in question was EUR 18.46 per 100 kg, accounting for 71% of milk output. The surveys unambiguously indicated that an increased scale of production had an upward effect on efficiency and profitability. The group of the largest holdings (35 to 75 cows) was characterised by a 31% higher value of milk production and 28% lower unit costs as compared to the smallest farms (2 to 5 cows). As a result, the gross margin in the largest entities was 55% higher, at EUR 18.86 per 100 kg, but it represented 69% of the value of milk production (Tab. 12).

Table 12. Gross margin at Polish dairy farms in 2006

Specification	Average dairy farm	By scale of production		
		2-5 heads	10-20 heads	35-75 heads
Number of cows	20	4	16,8	48,7
Yield	5474	3409	4843	6295
Values with EUR per 100 kg of milk				
Total revenues	29.49	27.62	28.92	30.00
- milk	26.16	20.84	24.86	27.29
- sales of calves	2.19	4.87	2.75	1.68
- sales of cows	1.13	1.91	1.31	1.03
Total variable costs	11.02	15.49	10.60	11.14
- Feed concentrates	3.65	3.05	2.84	4.22
- Health care	1.45	1.60	1.47	1.53
- AI and milk recording	0.42	0.63	0.43	0.24
- Replacement of cows	1.94	3.18	1.72	2.24
Gross Margin per 100 kg of milk	18.46	12.13	18.32	18.86
Gross Margin rate	0.71	0.58	0.74	0.69

Source: "Agrokoszty" - IERiGZ-PIB.

The analysis of the cost and sales structure has demonstrated significant differences between specific types of agricultural holdings. Small farms are characterised by a relatively low share of purchased feed concentrates (19%) in the structure of variable costs. It results from a considerable share of own fodder in cow feeding. This is not the case in large holdings as they use a great deal of purchased feeding stuff, and their share in the structure of variable costs is nearly 37%. As a consequence of high production intensity, the milk yield is 84% higher, and milk sales account for a major share of operating income. In small farms, sales of calves play a vital role, nearly triple the figure for large units per/in the equivalent of 100 kg of milk. In agricultural holdings with 35 to 75 cows a considerable share of calves are used for further breeding, and then for milk production.

The increased scale and intensity of production is also reflected in improved labour productivity. Labour inputs in large farms are 1.5 hours per 100 kg of milk, accounting for less than one-fifth of the figure for small entities (7.9 hours per 100 kg). Increased concentration of production in agriculture represents a prerequisite of an improvement in the efficiency and competitiveness of the Polish dairy sector in foreign markets.

3.2 Performance at industry level

3.2.1 Turnover and employment in the dairy industry

Between 2000 and 2007, total sales of the dairy industry nearly doubled, to EUR 5,980 million. It stemmed from approx. 20% higher milk collection and a price rise after Poland's accession to the European Union, and particularly the dramatic increase in prices in 2007 on account of very favourable situation in the world market. The majority of sales of the sector are generated by the operation of dairies and cheese making (NACE 15.51) as the share of the manufacture of ice cream (NACE 15.52) in total sales of the sector is a mere 3%.

The restructuring in the dairy industry was accompanied by reduction in employment. Between 1989 and 2007, employment in the dairy sector dropped from 83,000 to 40,500, of which a fall by 37,200 concerned the NACE heading 15.51. However, employment continues to be very high, 22% higher than in the German dairy industry which processes three times more milk. Consequently, the technological and economic labour productivity remains very

low. The technological labour productivity, measured by milk output per employee, was 230 tonnes, nearly four times lower than in Germany (837 tonnes). The gap in the economic labour productivity, measured by sales per employee, was even wider, which was determined by higher selling prices obtained by German enterprises (Tab. 13).

Table 13. Selected performance indicators of the dairy industry

Specification	2003	2005	2007
Number of companies	260	245	230
Employment ['000 Employees]	45.3	42.9	40.6
Gross Value Added [Mio. EUR]	1072.8	1817.3	2552.0
Gross Value Added per Employee ['000 EUR]	23.7	42.4	63.0
Net Profit	40.1	78.4	192.3
Net Profit per Employee ['000 EUR]	0.9	1.8	4.7
Productivity [tonnes of milk per company]	25.8	34.5	37.0
Labour productivity			
- [tonnes per Employee]	174	225	230
- ['000 EUR per Employee]	61.1	109.5	147.6

Source: Own calculations, unpublished GUS data.

The high employment in dairies is compensated with low wages/labour costs . Wages in the Polish dairy sector account for less than one-fifth of the figure for Germany. As a result, the wage efficiency indicator , measured by total sales relative to total wages/labour costs, is at a comparable level of approx. EUR 13. Low labour costs, as cheaper raw material, represented the main sources of competitive advantages. The continuing differences in wages/labour costs suggest that in the near future low wages/labour costs will be a determinant of competitive advantages of the domestic dairy sector.

3.2.2 Value added and profits

The processing of agricultural products of animal origin in Poland is characterised by low profitability, at $\pm 1\%$ of net income. A similar situation is observed in the operation of dairies and cheese making (NACE 15.51). The year 2007 was exceptional, due to very high selling prices obtained in the domestic market and in exports. It was confirmed by an increase in sales to EUR 5,980 million, i.e. by 40% on 2006. The dairy industry is characterised by a low share of value added, at 16-18%, but positive changes have been observed in its structure. Between 1995 and 2007, there was a fall in the share of labour costs/wages in the structure of value added, from 12.%% to 8%. At the same time, the proportion of capital showed a significant rise, from 3.5% to nearly 8%. As a result of investment and modernisation of processing plants, labour has been increasingly substituted with capital. Technical equipment and labour productivity have been growing. The process has not been completed yet as there is still significant scope for reducing employment and improving labour productivity in processing plants in the dairy sector. Investment processes have not been completed either. As a result, in the future capital will account for a higher share in the structure of value added than labour costs/wages. Labour-intensive production systems will be replaced with capital-intensive ones.

The manufacture of ice cream (NACE 15.52) represents secondary food processing and is characterised by a higher share of value added and greater profitability. In 2004-2007, net profitability ranged between 4% and 7% of net sales. It results from very different characteristics of production as such plants do not collect or process raw milk. Enterprises

operating in the manufacture of ice cream mostly process products of the dairy sector: milk powder and whey powder, cream and butter as well as products of other food industries (such as sugar, fruit preparations).

For years the Polish dairy industry has been characterised by a stable and secure financial standing, despite the rather low net profit relative to sales. In 2007 net profit of the dairy sector totalled EUR 192.3 million, i.e. 3.2% of net sales. Furthermore, the relatively low profitability in the dairy sector stems from the cooperative form of many plants. The economic activity of dairy cooperatives is aimed to maximise benefits for their members (shareholders/members, farmers). In such units profit maximisation is of secondary importance. The opposite is the case in private companies.

The favourable financial standing of the sector is also confirmed by a safe level of financial liquidity (1.3-1.4), which allows to raise investment loans. In addition to the favourable price conditions after integration, the positive economic situation is also affected by public support for investment projects (from national and EU funds). As a result, the dairy sector is characterised by very low financial costs.

3.2.3 Market share developments

The Polish industry remains fragmented and concentration proceeds at a slower pace than in agriculture. The consolidation of cooperatives is particularly slow. The low concentration of the sector is also reflected in the C_4 ratio, indicating the share of the top four companies in total sales of the industry. In 2007 the ratio was 19.7%. An industry is considered concentrated if C_4 exceeds 40%.

As a result of the restructuring and privatisation of the sector, there has been an increase in the share of private companies in sales and fixed assets. A group of market leaders determine the situation in the industry. In terms of milk processing, the top performers are the two largest dairy cooperatives, representing a total of 21% of milk collection. The two enterprises also account for the highest shares in total sales in the sector, 6.5% and 5.8% respectively. They only slightly outrank one of global conglomerates (5% of total sales, despite much lower milk output). It suggests that the conglomerate specialises in the manufacture of products characterised by high value added and high selling prices. Other sector leaders account for much lower shares in total sales, milk collection and employment.

The markets in specific dairy products significant vary in the degree of concentration of market shares as measured by the C_4 ratio. High concentration of market shares and very strong leaders are found in the manufacture of: concentrated milk (96%), yoghurts (85%) as well as of processed cheese and blue cheese (87%). The production of traditional dairy products is pursued by a very high number of businesses (mostly cooperatives) with limited market shares. It is confirmed by low C_4 ratios for products such as: drinking milk (10%), cream (28%), curd (22%), butter (15%) and milk powder (20%). In the manufacture of ripened cheese there are approx. 15 large producers, but the largest enterprises account for a relatively low market share (25%).

A great number of dairy cooperatives produce a wide range of products (mostly to local markets), therefore they cannot benefit from specialisation or economies of scale.

Furthermore, a high number of products makes promotion much more difficult and drives up marketing costs.

3.2.4 Competitiveness at retail level

The Polish market in dairy products is mainly supplied by domestic producers. Imports account for a very limited share of supply, up to 5%. The only type of imported dairy products available in large distribution chains is ripened cheese. In 2007 imports of cheese and curd totalled 26,800 tonnes, whereas domestic output exceeded 600,000 tonnes.

Imported goods included quality ripened cheese from the Netherlands, Germany, Switzerland and France, sold at very high prices (PLN 80 to 150 per kg) in 2008. Prices of domestic producers range from PLN 18 to 50 per kg (Tab. 14). Cheese produced in Poland is characterised by marked price competitiveness. It should be remembered, however, that product characteristics, e.g. the ripening period, are also very different, therefore taste value differ as well. Imported cheese are targeted at a narrow market segment of consumers with the highest income. Prices for domestic cheese, even if much lower than for imported products, continue to be excessive for a significant group of domestic consumers, which results in limited cheeses consumption in Poland as compared to the EU-15.

Table 14. Retail prices of dairy products in a supermarket in Warsaw, September 2008

Specification	Foreign Brands		Products of Polish companies
	imported	produced in Poland	
PLN/kg			
Gouda Cheese	80.00	-	18.40-18.60
Ementaler Cheese	120.00	-	-
Roquefort Cheese	150.00	-	45.00-50.00
Edam Cheese	-	-	18.25-18.75
Yoghurt_1	-	7.20-7.75	5.50-6.00

Source: Personal observation and an interview with the manager.

Imported yoghurts, milk-based beverages and butter are not offered in Polish retail trade, even in major foreign-owned distribution chains. It means that only in the case of yoghurts and milk-based beverages there is competition between products of foreign-owned corporations and those of domestic dairy cooperatives. In large distribution chains located in major cities Western European dairy corporations win the competition as they account for a predominate market share ($C_4=85\%$). In small retail outlets operating in smaller localities products of local dairy cooperatives, unable to sell across Poland due to a limited economic size, tend to be more competitive.

4 SWOT

4.1 Strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> • significant potential of milk production in Poland • production costs and collection prices still lower than in the EU • secure and stable financial standing of the dairy industry • formation of the group of market leaders and gradual concentration • the cooperative character of the dairy industry – production integrated with processing • significant investment activity and the availability of EU support • export expansion and export surplus • good cooperation with veterinary services and constant improvement in health standards 	<ul style="list-style-type: none"> • fragmentation of milk production and processing • restructuring and modernisation of farms and processing plants not yet completed • high restructuring costs reduce processing profitability • the cooperative form hampers the consolidation of entities – the management of the cooperatives as well as the farmers who are stakeholders are not interested in concentration due to fears of worsening their present situation • strong competition between cooperatives • limited marketing and organisation potential of dairy cooperatives • consumption stabilised at a low level

4.2 Opportunities and Threats

Opportunities	Threats
<ul style="list-style-type: none"> • scope for expanding milk collection as a result of increasing (or eliminating) milk quotas accompanied by a reduction in subsistence production and direct sales • a rise in domestic demand due to economic growth • increased interest in organic products • increased outlet after EU accession • EU market regulations result in economic stabilisation of production and processing 	<ul style="list-style-type: none"> • limited milk quota – a 7% rise in/by 2015 represents a favourable change, but does not allow full utilisation of production and processing capacities • competition from other EU Member States and the liberalisation of world trade • entry barriers for new agricultural holdings and dairies: CAP-related administrative barriers, environmental and health standards

5 Policy recommendations

In Poland the dairy industry represents a significant sector of the food economy and a major beneficiary of EU integration. The Polish dairy sector has been successful in the following:

- stabilisation of economic conditions for production and processing – an improvement in the profitability of milk production and the favourable financial standing of the dairy industry;
- access to EU funds;

- significant progress in compliance with EU standards, particularly with regard to veterinary requirements;
- considerable export expansion, mostly to the EU market;
- increased concentration of production and processing.

The introduction of the EU market regulation system has also been followed by certain negative developments:

- the low milk quota for Poland significantly impedes structural changes and the development of the sector at both production and processing level;
- the marked rise in prices for dairy products entailed a fall in consumption in 2004-2007.

In the near future, agricultural holdings and the dairy industry will continue modernisation and restructuring, which should bring about cost reduction, increased labour productivity and improved efficiency of production and trade. It will be stimulated by the ongoing CAP reform and the expected liberalisation of world trade as a result of WTO negotiations. This process involves the creation of favourable conditions for the development of economically viable agricultural holdings and industrial plants. The scope for financial assistance in this respect is likely to be limited in the future. In this connection, it will be indispensable to further support restructuring in the years to come, depending on available funds. In agriculture, such measures should be aimed at the reduction in the number of farms with cows as well as in dairy cattle accompanied by an increased production scale. As in the dairy industry, it is necessary to support the consolidation of companies, mostly cooperatives, into larger entities. Large processing enterprises make better use of their competitive advantages, are able to incur high promotion costs in foreign markets and cooperate with major distribution chains.

Consolidation of dairy cooperatives will result in growing cooperation (horizontal integration) but not in growing competition as it has been so far. The problem of market competition will then remain unsolved, however it would relax its outcomes for many cooperatives.

Despite the scheduled growth, the milk quota may prove to be a barrier to restructuring and have a downward effect on the production and processing capacity of the sector as well as on competitive advantages. This is an issue of special importance in the context of the desired rise in the consumption of milk and dairy products *per capita* in the future. As a consequence, it may prove indispensable to reduce export sales or significantly increase imports and intra-industry trade. The dairy sector requires much more active promotion both in the domestic and foreign markets. Such measures should result in an increase in consumption and an improvement in export competitiveness.