Dairy chain competitiveness in EU's new member states, candidate and potential candidate countries

Wettbewerbsfähigkeit der Milchketten in den neuen EU-Mitgliedstaaten, Beitrittskandidaten und potentiellen EU-Kandidaten

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Abstract

This comparative analysis of structures and performances of the dairy supply chain in 20 south-eastern and eastern European countries shows that even after many years of structural change, the sector is still dominated by small-scale and subsistence farming, which results in weak vertical integration in all countries except the Czech Republic, Slovakia, Cyprus and Malta. Industry performances indicate positive tendencies in the Baltic States and Poland, while the sector faces serious difficulties in others. In Romania, Bulgaria and all (potential) candidate countries, the industry has immense problems complying with food quality and safety standards. Vast investments are needed in all parts of the supply chain to increase productivity and improve the quality of products. A major restructuring of the supply chain is expected in upcoming years.

Key words

dairy; supply chain; performance; competitiveness

Zusammenfassung

In diesem Artikel wird eine vergleichende Analyse der Strukturen und Leistungen der Milchketten in 20 südost- und osteuropäischen Ländern durchgeführt. Die Ergebnisse zeigen, dass nach vielen Jahren des strukturellen Wandels die Milchketten immer noch von kleinen und Subsistenzwirtschaften dominiert sind, was in schwacher vertikaler Integration in den meisten Ländern resultiert. Ausnahmen bilden hierbei die Tschechische Republik, die Slowakei, Zypern und Malta. Die Leistungsfähigkeit der Milchkette zeigt positive Entwicklungstendenzen in den baltischen Staaten und Polen, während die Ketten anderer Untersuchungsländer ernsthaften Schwierigkeiten gegenüberstehen. Eine der größten Herausforderungen in Rumänien, Bulgarien und allen (potentiellen) Beitrittsländern ist die Adaption der Lebensmittelqualitäts- und Sicherheitsstandards. Beträchtliche Investitionen werden entlang der Milchketten benötigt, um die Produktivität zu erhöhen und die Qualität der Milchprodukte zu verbessern. Intensive Restrukturierung der Milchketten wird in den kommenden Jahren erwartet.

Schlüsselwörter

Milchmarkt; Wertschöpfungskette; Leistung; Wettbewerbsfähigkeit

1. Introduction

Since the fall of the Berlin Wall in 1989, countries in Eastern Europe have been working on reducing the structural weaknesses in their economies as part of the process of integrating into the world economy and preparing for European Union (EU) membership. As agriculture played (and still plays) a great role in those economies, much attention has been paid to reducing their over-reliance on agriculture and to overcoming the socio-economic problems in the sector. This article reviews the competitiveness of the dairy supply chain in the ten New Member States (NMS) that joined the EU in May 2004, as well as in Bulgaria and Romania, which became member states in January 2007, to show their present status and to indicate to what extent they are able to face international competition. In addition, this overview evaluates the dairy chain competitiveness in eight Candidate and Potential Candidate Countries (CC and PCC)[1], all of which aspire to join the EU when and if their political and economic development meets EU membership criteria.

The issue of competitiveness is highly complex and elusive, embracing issues of resource endowment and the quality of these resources (labour, capital, land, human resources), as well as the organisation and (efficient) use of resources. Managerial capabilities and performances are important too, like international demand and supply conditions, and unpredictable physical conditions such as climate. Also, the consequence of policy interventions affects competitiveness. Further, competitiveness can be assessed at the levels of a country, sector or firm. It can be also assessed at various market levels (bulk, niche, etc.). Furthermore, competitiveness is a dynamic concept, meaning that changing market conditions change competitive positions. The economic literature on this subject illustrates various approaches that can be followed to indicate competitiveness (see VAN BERKUM, 2004 for an overview) and offers no general theory about competition. Consequently, there is no single indicator of competitiveness (e.g. PORTER, 1990; KRUGMAN and OBSTFELD, 2008).

Therefore, an eclectic approach based on a match of the most important characteristics of the sector with various elements from theories to assess competitiveness is appropriate. Structure, conduct, and performance concepts (often used in an industrial organisation approach)[2] are combined with resource analyses (emphasised by traditional trade theories)[3] to judge the competitiveness of the dairy supply chain, to identify key constraints to competitiveness and to develop policy interventions to improve competitiveness. Given the relatively limited data set (at the farm level, but especially at processing level), the description and the combination of characteristics (structures, behavioural aspects,

[1] Currently, candidate countries are Croatia, Turkey and the Former Yugoslav Republic of Macedonia (FYROM). Potential candidate countries are Albania, Bosnia & Herzegovina, Kosovo, Montenegro and Serbia.

[2] A key reference is PORTER (1990).

[3] See e.g. KRUGMAN and OBSTFELD (2008) for an overview of international trade theories.

performance) of the sector and the market have been supplemented with expert interviews to enhance the basis for assessing the supply chain's competitiveness.

The structure of this paper is as follows. Section 2 provides an overview of the present situation in the primary (milk) production and (dairy) processing sectors, as well as the linkages in the supply chain. Section 3 further elaborates on the issue of evaluating factors, which influences competitiveness and efficiency at the farm and processing industry levels. Based on these analyses, main conclusions are drawn on the dairy supply chain's state of competiveness in section 4. This assessment is followed by a brief evaluation of prerequisites and directions for the sector's future development.

2. Overview of the dairy sector

2.1 Production and value added

During the first decade after the fall of the Berlin Wall, the dairy sector in the NMS had to cope with tremendous adjustment pressures. Privatisation and liberalisation contributed to intense competition on these countries' dairy markets (HARTMANN, 2001). Milk production strongly declined, relatively more than many other agricultural commodities (e.g. MACOURS and SWINNEN, 2000). Still, milk remained a major agricultural product in most NMS, a position still held today: milk accounts for 15-20% of gross agricultural output (GOA) in most of these countries (see table 1). Yet there are important outliers: in Hungary and Malta, for instance, the milk sector accounts for only 8%, while in Estonia 30% of agricultural output is related to the milk sector. Based on the data available from national statistical sources, the milk sector appears much less important in the CC and PCC:in most countries the sector contributes less than 10% to total agricultural output, although this share is over 20% in Montenegro.

Table 1. Importance of milk production in the agricultural sector in NMS, CC and PCC (2007)

NMS	Share of milk production in GAO (%)	Share of GVA of dairy industry in food industry (%)	Percentage milk production for processing (%)
Bulgaria	11.4 [1)]	7.6 [1)]	63 [2)]
Cyprus	14.0	13.5 [2)]	98
Czech Republic	20.2 [2)]	8.2	98
Estonia	29.8 [2)]	5.6 [2)]	86 [2)]
Hungary	7.6	10.8 [1)]	74
Latvia	21.4	14.5 [2)]	75
Lithuania	23	22 8	69 [2)]
Malta	7.7	n.a.	97 [2)]
Poland	18.6	10.3	79
Romania	n.a.	n.a.	62
Slovakia	17	6.3 [2)]	99
Slovenia	16	7.4	80
(P)CC			
Albania	n.a.	n.a	23
Bosnia & Herzegovina	n.a.	n.a	23 [1)]
Croatia	9 [1)]	n.a.	78
FYROM	9 [2)]	35-70 [4)]	>50 [2)]
Kosovo	n.a.	n.a.	14
Montenegro	22 [2)]	8 [2)]	14
Serbia	7.4 [1)]	8.6 [1) 3)]	52
Turkey	9	15	50
EU-15 average	14.1	9	95

Notes: [1)] = 2005; [2)] = 2006; [3)] % of Gross Domestic (material) Product, not of Gross Value Added; [4)] data 1998-2006, with strong increase in 2005 and 2006. n.a. = not available.

Source: Various country reports at http://www.agripolicy.net.

With milk being an important agricultural sector in the NMS, one may expect the dairy sector to contribute significantly to the food industry's value added. However, this is not the case for Bulgaria, the Czech Republic, Slovakia, Slovenia, Montenegro and Serbia, where dairy accounts for less than 10% of the food industry's value added. Especially in the Czech Republic, Slovakia, Slovenia and Montenegro, the figures show a much higher share of milk production in the GAO than the dairy industry's share in the food industry's gross value added (GVA). This indicates that the dairy industry in the latter countries can be characterised by rather low value added, stemming from a relatively high share of low-processed products in total sales (e.g. drinking milk, cream, milk powder, whey powder, curd). Consequently, competition between the dairy industry and other parts of the food industry on the domestic market for production factors (labour and/or capital) is weak. Again, the figures point to different conclusions for the dairy industry in Cyprus, Hungary, Lithuania, FYROM, Serbia and Turkey, where the ratio of the sector's GAO and GVA share indicates a competitive advantage of the dairy industry over other food industries. However, it is important to note that over time, the share of GVA of the dairy industry in Hungary and Serbia has declined, indicating a lessening of its competitive position. The FYROM case suggests other food industries than dairy face serious economic difficulties.

2.2 Product flows within the sector

The dairy industry in the EU-15 is strongly vertically integrated: basically all milk produced by farmers is sold to processors. This characteristic is related to the continuous process of specialisation, increasing scale of production and the subsequent professionalism that is required to be able to produce efficiently and according to the strict demands of hygiene and food safety as formulated in EU regulations. On-farm processing and/or direct selling to consumers is only a minor activity, considered a niche in the mainstream market for processed dairy products.

A similar situation of strong vertical ties can be found in the dairy supply chain in the Czech Republic, Slovakia, Malta and Cyprus, in which 97% or more of the total milk production is being delivered for processing (see table 1). Although increasing over time, chain linkages are not that strong yet in at least half of the NMS: less than 80% of the milk produced is delivered for processing in Bulgaria, Hungary,

Latvia, Lithuania, Poland and Romania. In all CC and PCC, chain linkages are typically weak (except for Croatia). A major feature of the dairy sector in these countries is the low utilisation of the milk produced by processing enterprises. A significant share of the milk produced continues to be consumed on the farm, either for own consumption or for animal feed. Furthermore, farmers sell milk directly to consumers on street markets. The high level of farm usage and direct selling is a consequence of several factors, including the small-scale structure of production, a consequential lack of commercial orientation amongst many producers, an underdeveloped milk collection system, attractive street market prices compared to the price offered by processors, and the unreliability of milk payments made by some processors. A major challenge in the commercial development of the dairy sector in the countries mentioned is to increase the supplies of good quality raw milk to the processing sector in a cost-effective manner.

2.3 Structural features at primary level

The number of dairy farmers in the 20 countries examined is high: approximately 4.8 million farms have dairy cows (10 times more than in the EU-15), of which 2.1 million are in NMS and 2.7 million in (P)CC. Yet, these farms are highly concentrated in only a few countries in the region; almost 85% of all dairy farmers in NMS can be found in Poland (53%) and Romania (31%). Turkey accounts for 2.1 million dairy farmers. Together with Albania and Serbia, these three countries account for 94% of all farms with dairy cows in the 8 (P)CC.

Most countries exhibit a strong dual dairy farm sector, with a large number of relatively small-scale producers and a small percentage of large producers which still handle a large share of the total dairy herd. The structure of the dairy farms is dominated by the category of holdings, with 1-5 cows (see table 2). This group includes farms with 1 or 2 cows producing exclusively for own consumption or limited direct sales. The sector's structure in Cyprus, the Czech Republic, Slovakia and Malta is quite different, however; here the average dairy farm is far above the EU-15 average size of 37 cows. The number of dairy farms in the four countries mentioned are less than 4,000, which is a very small part of all dairy farmers in the NMS, CC and PCC combined.

In all NMS, the number of agricultural holdings with cows dropped significantly in the last decade. For instance, the number of dairy farms in Poland dropped by 50% between 1996-2007. In Hungary, the number of dairy farmers dropped from 52,000 in 2000 to only 20,000 in 2007. In Lithuania and Slovenia, this number dropped by 50% and 33%, respectively, from 2000 to 2007. However, it is remarkable that the number of farms in Slovenia has not changed since the country has become a member of the EU, especially since 2004, Slovakia and the Czech Republic have faced an annual 3.5% decline of dairy farmers. The latter

Table 2. Farm size structure – average number of dairy cows per farm and share of dairy cow farms per size classification (2007, if not stated otherwise)

NMS	Average heads/farm	% farms <5 cows	% farms with 5-19 cows	% farms ≥20 cows	Dairy herd (000 heads)	Farms with dairy cattle
Bulgaria	2.7	91.5	6.8	1.7	336	122 711
Cyprus[1)]	228.2	5.3 (≤10)	6.1 (11-50)	88.6 (>50)	56	245
Czech Republic	165	4.3 (≤10)	13.7 (11-50)	82 (>50)	423	2 562
Estonia	14.5	65 (1-2)	25 (3-19)	10	104	7 174
Hungary[1)]	19.8	56 (1-2)	33 (3-10)	11 (>10)	321	16 249
Latvia	4.6	84.4	11.7	3.9	179	38 825
Lithuania	3.3	90.5	8.3	1.2	396	120 982
Malta	50.6	5 (1-2)	29.5 (3-29)	65.5 (≥30)	7.5	149
Poland	4.2	88.4 (<10)	10.2 (10-30)	1.4 (>30)	2 787	656 300
Romania	1.6	98.7	0.7 (5-10)	0.6 (>10)	1 700	1 100 000
Slovakia	183	23 (≤10)	10 (11-50)	67 (>50)	181	992
Slovenia	6.5	60	33.5	6.5	124	19 200
(P)CC						
Albania	1.5	99	1 (>5)		396	270 930
Bosnia & Herzegovina	2.3	94	5.5 (5-10)	0.5 (>10)	58	25 057
Croatia[2)]	3.1	85	13 (5-10)	2 (>10)	237	77 039
FYROM	3.2	n.a.	n.a.	n.a.	164	50 617
Kosovo	1.7	94	5 (5-10)	1 (>10)	140	83 289
Montenegro[3)]	2.9	90	9.8	0.2	78	26 277
Serbia	2.7	90 (1-2)	9 (3-10)	1 (>10)	602	221 625
Turkey[4)]	1.9	84.3 (<10)	11.4 (10-19)	4.3	4 229	2 100 000
EU-15[5)]	37.3	25 (<10)	16 (10-19)	59	17 974	482 250

Notes: [1)] 2005 data; [2)] 2003 data; [3)] 2008 data; [4)] 2001 data; [5)] Eurostat (Farm Structure Survey); n.a. = not available.

Source: Country reports at http://www.agripolicy.net.

pace of structural change is similar to what is happening in many western European countries.

Considering the share of subsistence farmers, it is very likely that the primary dairy sector in many NMS will face further radical structural changes. Very many of these small-scale producers are outside the milk quota allocation system.[4] This implies that only with relatively high investments related to expansion (in land, animals, quota, stables) and compliance with veterinary, sanitary and food safety regulations, will this category of farmers be a part of the commercially-oriented dairy chain. However, these farmers lack (access to) the capital necessary for these investments and hence many of the small-scale producers will (have to) leave the sector in due time. The speed of this process depends largely on the general economic growth in the countries at hand, which determines both the level of social services (pensions, unemployment benefits, education, etc.) and alternative employment opportunities.

Milk production in the (C)PP is even more characterised by a significant fragmentation of dairy farms than in the NMS. Over 80% (in some countries even over 90%) of all farms with cows have less than 5 animals (see table 2). Only a small percentage of the farms in these countries are commercially-oriented, i.e., sell milk to processors. This is most likely the category of farms able to make the necessary investments for business expansion and operational improvements in order to comply with increasing quality and food safety requirements. Small-scale producers typically have problems acquiring external finance for buying land and/or animals or making other investments. Support programs from the EU may be a source of finance for such investments, but eligibility criteria may rule out the smallest farmers, as their prospects of building economically viable farms are generally considered to be low. The strong fragmentation of the dairy sector in these countries indicates that an immense structural change has to take place in order to meet EU membership criteria, i.e., of a viable economic sector able to compete on the internal market.

Table 3. Concentration of milk processing (2007)

NMS	Intake by Top 5 as % of milk production processed (est.)	Total number of dairies in operation	Dairies with less than 50 employees
Bulgaria	20%	229	184
Cyprus	n.a.	82	77
Czech Republic	Top 3: 35%	40	n.a
Estonia	68%	29	n.a
Hungary	Top 10: 81%	50	41
Latvia	Top 4: 61%	52	31
Lithuania	Top 4: 90%	32	18
Malta	1: 100%	1	0
Poland	Top 5: 26	232	76
Romania	n.a.	876	818
Slovakia	n.a.	45	23
Slovenia	Top 3: 90%	22	17
(P)CC			
Albania	n.a	416	5 dairies >20
Bosnia & Herzegovina	42%	53	42
Croatia	81% (Top 2: 67%)	37	27 (≤20)
FYROM	Top 4: 90%	85	81
Kosovo	Top 7: 23%	19	n.a.
Montenegro	63%	19	16
Serbia	67%	250	230
Turkey	50%	2 299	2 235

Note: n.a. = not available

Source: Country reports at http://www.agripolicy.net.

2.4 Industry structure at processing level

In most countries significant structural changes have occurred in the dairy industry: the number of milk processors in 2007 is much less than it was ten years ago, as many small companies have left the sector or have been taken over by others. Together with automation and the introduction of new technologies, the number of employees in the industry has declined significantly. The trend is that the largest companies have increased their share of the total milk production processed. The dairy industry in the NMS appears most concentrated in the Baltic countries, Cyprus, Malta and Slovenia, where the top 5 dairies process over 60% of the milk (table 3).

With the increasing plant size of operation and the increasing concentration, trends in the dairy industry in the region counters developments that took place in the 1990s. The dairy processing industry was generally very concentrated during the communist period. The privatisation process in the 1990s and the establishment of new plants led to a substantial increase in the number of dairies in most countries. However, many have disappeared again in the build up to EU membership. The remaining companies have been forced to undertake ample innovation and improvements by incorporating hygiene (HACCP) and quality (ISO)[5] systems. EU SAPARD[6] funds helped to finance the introduction of these systems, as well as foreign investment in the NMS dairy industry. Finance is, however, still a major problem for many dairies to invest in quality-improving technology.

Especially in Romania and Bulgaria numerous small-scale processing units use too much outdated and unsuitable technology to comply with the presently required hygienic and quality standards. In Bulgaria, only 27 companies (out of 229) met the requirements of 853/2004/EU on health and hygiene, and are permitted to export dairy and cheese pro-

[4] In Poland, a milk quota has been allocated to only one-third of farms with dairy cows. These percentages are around 50 in Slovenia, Lithuania and Latvia, and 25 in Estonia. In Bulgaria, only 3% of dairy farmers have been assigned a milk quota, as these farms (are expected to) comply with EU hygiene and quality requirements.

[5] HACCP = Hazard Analysis Critical Control Points ; ISO = International Organisation for Standardisation, which develops standards for all industry sectors on all kind of themes, among others on quality.

[6] SAPARD = Special Accession Programme for Agriculture and Rural Development

ducts to the EU (see table 3). The majority of the dairies are simply too small to attract the necessary capital for expanding and updating their equipment to comply with quality and food safety standards. By 2010, all dairies will have to comply with the EU rules. Further reorganisation of the Bulgarian dairy industry, therefore, seems very plausible, just as in Romania where it is very unlikely that many of the over 800 small-scale dairies will be able to operate according to EU standards.

There has already been a comprehensive reconstruction in the dairy industry in Poland, where the number of companies decreased from over 400 in 1993 to 230 in 2007. Still, the country's dairy industry is fragmented, with relatively small plants compared to EU-15 standards. Finance for restructuring the industry has largely come from the domestic private sector: farmers' cooperatives are the owners of Poland's two largest dairy companies. Foreign investment in Poland's dairy industry entered the country in the early 1990s, yet its scale has remained modest. In Romania, on the other hand, foreign investors and multinational dairy companies have been important for the sector's development. Entering mainly between 1998-2000, the multinationals invested in and took over several Romanian ex-state dairy companies, which have been transformed into competitive companies and are among the larger dairy processors in Romania: three foreign-owned companies (Danone, Friesland and Hochland) are among the top 5 processors.

Compared to other countries in the region, foreign investment (from Germany, France, Italy and Austria) entered the Slovakian dairy industry relatively late and on a substantial scale only since 2000. The industry's main problem today is its low capacity utilisation. With 45 companies operating in a relatively small market – while farmers sell raw milk cross-border to foreign companies for higher than domestic prices – the average size of most dairy companies is rather small, limiting the companies' possibilities to benefit from increasing scales of production. The Czech Republic has 40 companies engaged in milk processing, of which 40% have foreign capital participation, especially from France- and Germany-based companies (e.g. Bongrain, Danone, Lactalis, Műller Milch and Ehrmann International). By contrast, there is no foreign investment in the Slovenian dairy industry, whereas agricultural cooperatives hold important positions in all large dairy companies. The industry is highly concentrated in Slovenia: the largest three companies process about 90% of the raw milk intake, while one dairy company has a share of 51%.

In the Baltic countries a few companies dominate the domestic markets. In Estonia the 5 largest (out of 29) companies account for 68% of total intake. Four companies operate with foreign shareholders. In Lithuania the milk processing industry is one of the most concentrated and modern sectors in the national food industry. The four largest companies process over 90% of all milk purchased in the country and are the major exporters of dairy products. Latvia's milk processing industry has a dual structure similar to the other two Baltic countries: of the 52 companies, five are comparatively large dairy companies which have an estimated uptake of 70% of all milk processed. 34 milk producers' cooperatives collect milk and sell it to domestic and foreign (Lithuanian) processors. These cooperatives collect approximately 1/4 of all milk deliveries, with the two largest cooperatives accounting for almost half of all milk collected. Some Latvian cooperatives are determined to purchase or establish a common milk processing company.

In Malta the dairy industry consists of one major company, Malta Dairy Products, which is 70% owned by a farmers' co-operative and 30% state-owned. Cyprus on the other hand, counts over 80 dairies, though most of them are very small. Recently two larger companies merged (with Greek investments) and dominate the country's fresh milk market.

Statistics on the dairy industry in CC and PCC are generally poor. A general feature of the industry is its small-scale and seasonal operation. Technology applied in the majority of the dairy plants is rather primitive, while the mechanisation grade is low. Many of the small processing establishments do not comply with modern food safety standards. These plants produce cheese, butter, curd and yoghurt for the local markets. Typically the industry in Albania, Kosovo, FYROM and Montenegro is very small-scale, fragmented and technically underdeveloped, although in the latter two countries there are a few relatively large companies that account for the majority of the milk processed. The dairy industry in Turkey has similar dual structure features, especially in the western part of the country, which has about 10 to 20 modern equipped companies operating at respectable standards.

Foreign companies have shown limited (Turkey, FYROM) or no interest to invest in the PCC mentioned in the previous paragraph. Presently, six of the larger dairies in Bosnia and Herzegovina are foreign-owned (in a majority), which made the inflow of foreign capital contribution important to the dairy industry's post-war reconstruction. This already provides positive effects on product assortment and improving quality levels, as these foreign-owned companies bring in marketing and management expertise. Through recent investments in quality assurance systems (HACCP, ISO, export licensing), the sector exhibits efforts to upgrade quality management, but at the same time it is clear that this process is only in its initial stage. Also in Serbia and Croatia, foreign investment plays an important role in the country's dairy sector primarily by introducing technical improvements and the application of quality standards. In Serbia the foreign investment fund Danube Food Group owns most of the larger dairies. Milk processing in Croatia is dominated by two companies – one of which is foreign-owned. These dairy companies have modern production technology and comply with EU quality and hygiene standards. Other dairies in both Serbia and Croatia are relatively small, and most of them can be categorised as handicraft dairies producing dairy products for the local market. Many of these dairy plants operate at very small scale and would have great difficulties complying with today's international quality and hygiene requirements.

2.5 Production, consumption and trade developments

Table 4 provides an overview of developments in production and trade in all 20 surveyed countries over the last decade. It is generally known that milk production declined sharply in the 10 East-European NMS in the 1990s due to structural changes in their economies and in the sector.

Table 4. Production and net trade position, 2006

NMS	Production (tonnes)	Production trend over last 10 years	Self-sufficiency rate[1)]	Trends in trade position (in terms of trade volumes)
Bulgaria	1 327 000	Slightly declining	106	Rather constant net export surplus
Cyprus	140-150 000	Stable	n.a.	Increasing imports, increasing net import deficit
Czech Republic	2 700 000	Stable	117	Imports increased much more than export, net export position declines
Estonia	830 000	Slightly increasing	134	Increasingly positive net export position
Hungary	1 800 000	Slightly decreasing	101	Increasing imports
Latvia	841 000	Slightly fluctuating	130	Increasing net export surplus
Lithuania	1 900 000	Slightly increasing	168	Increasing net export surplus
Malta	38 000	Slightly decreased since 2003	78	Stable imports, negligible exports
Poland	12 000 000	Constant	120	Increasing exports, stable imports
Romania	4 850 000	Increasing since 2000	92	Growing net-import position
Slovakia	1 100 000	Constant	129	Increasing exports and imports, net export position reduces
Slovenia	666 000	Slightly fluctuating	120	Growing exports and imports, net export position reduces
(P)CC				
Albania	1 100 000	Steadily increasing	n.a.	Rapidly increasing imports
Bosnia & Herzegovina	724 000	Gradually increasing	85	Declining yet still significant imports
Croatia	834 000	Steadily increasing	95	Import declines, exports go up
FYROM	235 000	Gradually increasing	98	considerable fluctuations in both imports and exports
Kosovo	240 000		74	Slightly increase of imports
Montenegro	189 000	Decreasing	80	Increasing imports
Serbia	1 550 000	Rather stable	103	Exports are increasing
Turkey	12 000 000	Increasing	99	Exports and imports are low

Note: [1)] production as % of consumption

Source: Country reports at http://www.agripolicy.net.

Since the second half of the 1990s, milk production has increased in these countries but previous levels have not been met. Production levels do not show much dynamism over the last five to ten years, also because production in the 10 NMS is subject to the EU quota system since 2004. The exception to this rule seems to be Hungary, where production declined by 10% between 2001 and 2006. However, it should be noted that while over time, production levels may have been rather constant in most countries, the production volume of processed dairy products have increased significantly. This is due to the increasing proportion of milk delivered to the industry for processing.

Indeed, the increased production of cheese, milk-based beverages, yoghurts and ice cream is notable in all countries. By contrast, production levels of liquid (fresh consumption) milk have gone down in most countries, as has butter. These tendencies are the result of the response to changing consumer preferences linked to increasing income levels. Increased purchasing power leads consumers to demand more product variety, more higher quality products and more convenience foods. At the same time, however, retail dairy prices have increased as the result of the dairy sector being included in the EU system of market regulations, which either has hampered further consumption growth or depressed consumption levels in volume terms (e.g. Poland).

The results of dairy production and consumption trends are illustrated in the surveyed countries' trade patterns. Cyprus, Malta and Romania are net-importing countries, while other NMS achieved an export surplus on the trade balance for dairy products. Looking at trade developments, it is found that the Baltic countries and Poland (a traditional exporter of dairy products) have improved their net export position in recent years, while countries like the Czech Republic, Hungary, Slovakia and Slovenia show a declining export surplus. Trade relations with EU countries have intensified, both as export and import markets.

A remarkable feature of the export/import relationship is the cross-border trade of raw milk. For example, farmers from Slovakia sell milk to Austria and Hungary, while Latvian farmers transport milk to Lithuania for processing; Czech farmers have supplied German processors since the Czech Republic entered the EU. In 2007 the volume of exported raw milk reached 17% of all Czech milk production. Hungary is reporting 15% of the milk produced there is being sold to Romania, Slovenia and Italy. The Slovenian farmers on their turn sold 9% of the domestic milk production abroad (mainly to Italy) in 2005, which increased to 30% in the first seven months of 2008. Major triggers of this trade are price differentials and the proximity of the processors (just) across the border, thus reducing transport costs.

Dairy markets in the CC and PCC show a deficit. Serbia is the only net-exporting country of this group and figures indicate that Serbia's exports are increasing, especially since Montenegro became an export market in 2006. Other major export markets are Macedonia and Bosnia & Herzegovina. In the latter countries, milk production has increased in recent years, but as consumption also grows, imports tend to increase. Production increases in Croatia have been more than enough to cover consumption growth, which has caused a decline of the net-import position (in volume terms) of this country. Dairy consumption growth in Albania, Kosovo and Montenegro is largely based on increasing imports, mainly from the neighbouring countries of Serbia, Croatia, Slovenia and Greece. Turkey is more or less self-sufficient in dairy products and not very integrated in international trade flows.

Table 5. Cow yields: national average levels and annual growth

NMS	Level 2007 in kg/cow	National yield level compared to EU average (index, EU-25= 100)	Yield growth per annum (%, period measured)
Bulgaria	3 600 [2)]	54	0.5 (02-06)
Cyprus	5 500	82	1.4 (96-07)
Czech Republic	6 725	101	3.6 (00-07)
Estonia	6 368	96	5.6 (96-07)
Hungary	6 448 [1)]	97	3.0 (99-05)
Latvia	4 636	69	2.7 (98-07)
Lithuania	4 708	71	5.8 (99-07)
Malta	5 638 [2)]	85	4.3 (03-06)
Poland	4 400	65	2.9 (95-07)
Romania	3 600 [2)]	54	2.0 (96-06)
Slovakia	5 688	85	7.0 (97-07)
Slovenia	5 924	89	5.6 (97-07)
(P)CC			
Albania	2 192	33	n.a.
Bosnia & Herzegovina	2 360	35	4.5 (96-07)
Croatia	3 555	53	6.2 (98-07)
FYROM	2 497 [2)]	37	4.0 (02-06)
Kosovo	1 500-2 000	22-30	n.a.
Montenegro	2 450	37	n.a.
Serbia	2 663	40	3.8 (97-07)
Turkey	2 600	39	n.a.
EU-25	6 661 [2)]		3.3 (03-06)

Notes: [1)] 2005 data; [2)] 2006 data

Source: Country reports at http://www.agripolicy.net.

3. Performance of the supply chain

3.1 Yields performance at farm level

Table 5 provides an overview of the yields per cow in all NMS, CC and PCC. The figures presented are national averages. With a few exceptions, these are generally low compared to the EU-25 average. However, in most countries the national average is affected by the large number of holdings with 1 or 2 cows. Larger farms generally achieve higher production per cow, which is the result of a farm's structural feature combined with the farmer's management practices. The larger, more professional farmers have shown increasing interest in testing the milk performance of their cows. In many NMS milk monitoring has become an integrated part of the milk collection system. Farmers delivering their milk to processors are frequently visited by quality control inspectors. Yet, only part of the dairy cow herd is monitored in this way. For instance, in Poland only 19% of the dairy herd was monitored. Milk yield on these generally much larger than average farms was 6,700 kg, or roughly the same as in the EU-15.

Presenting national averages also hides significant differences that occur between breeds. Yields of multipurpose cows (meat and milk) are substantially lower than yields of, for instance, the Frisian Holstein, a typical milk cow. With increasing specialisation towards dairy production, local multipurpose breeds are increasingly substituted for higher milk-yielding cows through the purchase of breeding heifers or cows, or through genetic improvements of the existing herd. Moreover, the increased professionalism of farmers (through training and extension) contributes to improved farm management, including the nutrient management of the animals.

While information is not available for all years since 1996 for all countries, the data indicate that the pace of yield increase has been significant in the region. Where the average yield for the EU-25 shows an annual increase of 2.5%, the yields have grown significantly stronger in all NMS except Bulgaria, Cyprus and Romania. Yields in Bulgaria and Romania are no more than 54% of the average yield in the EU-25. On the other end of the spectrum, yields in the Czech Republic, Hungary and Estonia are similar or close to the average EU-25 level.

Yields in the CC and PCC are typically at a much lower level: around one-third to one-half of the EU-25 level (see table 5). There are also major differences in these countries between the national average and yields achieved at farms that participate in regular milk monitoring. The example of Montenegro shows that, while the country's average yield is registered at 2,450 kg/cow/lactation, those cows included in a regular milk monitoring scheme (around 3% of the herd) achieved an average of 5,114 kg, with great variation among breeds and regions. Such examples illustrate what can be achieved in these countries by farmers who have an entrepreneurial and commercially-oriented attitude, and with a farm structure that fits efficient production.

3.2 Gross margins at farm level

Comparing data that indicates a given sector's economic performance between countries is difficult, as accounting definitions, calculation methods and sample selection may differ. The NMS, however, are all part of the Farm Accountancy Data Network (FADN), the EU-wide farm bookkeeping system accessible through Eurostat. In order to provide the necessary data the NMS governments or national research institutes conduct surveys on production costs and

profitability on all relevant agricultural products. Therefore, the FADN is the EU's major common source of information on economic performance in the agricultural sector.

However, the evaluation of gross margins in most CC and PCC suffers from the defect of little official statistical data. To calculate gross margins (revenues minus the costs of variable inputs) of milk production, one needs on-farm milk prices (paid by the processor), quantities offered to processors as well as data (quantities and prices) of inputs used. In all CC and PCC, the majority of farmers do not do any bookkeeping, the result being that the public institutions responsible for statistics do not have a solid basis to provide the necessary data that would help to calculate performance ratios of the milk production in these countries. From time to time, ad hoc research is done on costs and revenues. Yet, these studies are based on primary surveys in which, most often, only a small sample of farms are taken into account. All too often the studies conducted focus on the large(r) farmers, which depicts a situation not at all representative for the sector. Other studies are mainly based on assumptions with respect to inputs for a 'typical' milk producer, which obviously do not take into account the wide diversity of farm features in the country.[7]

Despite all the data limitations in the NMS, CC and PCC, endeavours to trace relevant data provide us with some indications of dairy farming's profitability in these countries. The average dairy farm in the EU[8] achieves a gross margin rate of 62% (gross margin divided by the total revenues at the dairy farm) (see table 6). This 62% of revenues is available for covering fixed costs of land, (hired) labour and capital, and for a farmer's profit (livelihood). Considering this EU-average as the norm, the available data show that within the group of NMS this level is only reached in Slovenia and Poland. Data in table 6 also indicate that the gross margin rate of return is particularly low (<50%) in Bulgaria, Hungary, Slovakia and Malta – the latter despite the relatively high milk price, as high feed costs result in low margins. Within the group of CC and PCC, the average dairy farmer in Bosnia-Herzegovina is the only one whose gross margin exceeds the average EU-15 level, whereas these margins range from 40-55% of gross revenues in the other countries. All these countries report relatively high costs for animal feed (roughage and feed concentrates). This indicates that farmers have to improve feed efficiency in order to increase their gross margin rate of return. Yet improving feed efficiency may imply investments in genetic improvements of the herd or improving feed management. Both would require investments and training and hence would mean a medium- to long-term endeavour.

Table 6. Gross margin at farm level – average dairy farm, values in Euro per 100 kg milk, data from year as indicated

NMS	Total revenues	Variable costs	Gross margin	GM rate of return on total revenues
Bulgaria (2004)	29.4	18.1	11.3	38%
Cyprus (2008)	54.8	23.5	31.3	57%
Czech Republic (2006)	27.8	12.8	15.0	54%
Estonia	n.a.	n.a.	n.a.	n.a.
Hungary (2007)	35.5	18.3	17.2	48%
Latvia (2006)	38.2	18.8	19.4	51%
Lithuania (2006)	25.2	11.1	14.1	56%
Malta (2007)	46.2	34.7	11.5	25%
Poland (2006)	29.5	11	18.5	63%
Romania	n.a.	n.a.	n.a.	n.a.
Slovakia (2007)	34.7	18.9	15.8	46%
Slovenia (2007)	39.4	12.9	26.5	67%
(P)CC				
Albania (2007)	54	30	24	44%
Bosnia & Herzegovina (2005)	32.9	11.0	21.9	67%
Croatia (2007)	42.7	26.2	16.5	39%
FYROM (2004)	36.1	17.1	19	53%
Kosovo (2005)	32	22	10	31%
Montenegro (2006)	38.5	17.3	16.7	49%
Serbia (2007)	30.7	15.3	15.4	50%
Turkey	n.a.	n.a.	n.a.	n.a.
EU-15	n.a.	n.a.	n.a.	62%

Notes: n.a. = not available

Source: Country reports at http://www.agripolicy.net.

3.3 Performance of the dairy industry

The background reports to this paper showed that official data on the dairy processing industry are scarce, particularly in the CC and PCC. The relatively small data set reported for the processing part of the dairy chain prevents an accurate evaluation of the dairy industry's performance in the countries concerned. This section therefore summarises briefly the situation in the dairy industry using reported performance indicators which when combined provide some insight into the competitiveness of the dairy processing industry.

The Polish dairy industry shows many signs of positive developments towards increasing international competitiveness. While the present number of dairies and the milk processed is much less compared to the early 1990s, the industry's total sales doubled between 2000 and 2007. Employment in the industry declined substantially due to the restructuring process, which together with modernisation and investments has greatly improved the technical, as well as the economic labour productivity. Yet, these indicators remain low compared to, for instance, the German dairy industry. A positive sign of enhanced competitiveness is also shown in the increasing share of high value added products (cheese, milk-based beverages and ice cream) in

[7] Country reports for Kosovo, Serbia, Croatia, Bosnia & Herzegovina provided insights into the situation for different size categories of farmers, based largely on assumptions and estimations rather than observations.

[8] The 2006 average of 20 countries (EU-25 except Cyprus, Germany, Greece, Slovenia and Spain), which where available in the FADN database (Eurostat).

the product assortment. This reflects the sector's ability to respond to the increasing demand for these products on the domestic market. While facing competition with the rest of the EU, the Polish dairy market is still mainly supplied by domestic producers and imports account only for a very limited share of national consumption.

Developments in key indicators that assess the dairy industry's performance in the three Baltic states show similar trends to those in Poland. Sales, value added per employee, and profits, as well as export positions, have improved significantly over the last 10 years, while the industry's product mix has broadened. A rapid process of concentration, restructuring and modernisation (supported by SAPARD and EU structural funds) of the industry has taken place in these countries, where a limited number of companies dominate the market. However, productivity is still relatively low compared to what is achieved in many EU-15 countries. This is explained by small-scale production and a still relatively low production capacity utilisation in the overall dairy industry.

Less positive developments are reported by the dairy industry in the Czech Republic, Slovakia, Hungary and Slovenia. Increases in sales, value added and labour productivity have been modest, but profits and exports, as well as domestic market positions are declining, the latter emphasising the industry's vulnerability to foreign competition. The dairy industry in these four countries faces a substantial flow of raw milk to neighbouring countries for processing, which of course negatively affects the industry's capacity utilisation rate. Further, increasing imports of dairy products in these countries account for an increasing share of domestic consumption, which implies that the domestic dairy industry is losing market share to foreign competitors.

The dairy sector in Malta and Cyprus produces a mix of products heavily oriented towards the commodity sector, particularly liquid milk. Products in these countries feature relatively low levels of branding and product innovation, resulting in the industry's relatively low added value. For short shelf life products, the island producers may have a 'natural' competitive position, yet the relatively small industries have limited possibilities to invest in product innovation and marketing, and are therefore less equipped to face international competition in processed products.

In both Romania and Bulgaria, the larger milk processors (some with foreign investment) seem to do relatively well, showing positive development in sales, profits and labour productivity. Yet, the general picture at the national level is less positive. The most concerning issue in these two NMS since 2007 has been the particularly low number of dairies that comply with EU rules on hygiene, food safety and quality. Considering the small-scale structure, the huge financial challenge to make the necessary investments, the lack of financial means, difficulties accessing credit and the obligation to adopt EU rules by 2010 at the latest, it is very unlikely that many Romanian and Bulgarian dairies will survive.

Data on dairy industry performance in CC and PCC are particularly scarce and for the time being evaluations depend on information based on a few company interviews, small surveys and on (little) available statistics. From that, industry performances in Serbia, Croatia and Turkey appear most promising. For instance, Serbia's dairy industry has shown a strong increase of sales in the domestic market since 2000, while productivity in the dairy industry increased faster than productivity in other sectors of the food industry. In the retail shops, the domestically produced dairy products prove to be competitive with foreign brands, as quality is evaluated to be of a similar level, but Serbian products are cheaper than most imported dairy products. In Croatia and Turkey, there is no data on the industry's revenues and profits. However, the two largest companies (accounting for two-thirds of the milk intake) in Croatia use modern technology, comply with EU quality and hygiene standards and have strong domestic market positions, which indicates that these companies perform rather well. In Turkey a limited number of dairy companies – especially in the western part of the country – operate according to western standards and produce a full range of dairy products. Still, the vast majority of small-scale dairies in Turkey operate seasonally and informally. The lack of good quality milk hampers the development of the industry's product mix: the majority of milk is processed into traditional and low added value products like drinking milk (long shelf life milk, ayran), white cheese and butter.

The performance of the dairy industry in Albania, Bosnia & Herzegovina, FYROM, Kosovo and Montenegro suffers from the low quality of raw milk supplied, while the industry itself is technologically underdeveloped and operates on a very small scale. The great majority (75%) of the Albanian dairy industry does not comply with universally used food safety standards, while in Kosovo no dairy company complies with EU health and hygiene standards. The Bosnian and Kosovar markets are dominated by foreign supply, and dairies in FYROM and Montenegro also face fierce competition with foreign suppliers in their national markets. Companies in all these countries traditionally produce drinking milk, UHT-milk, various local cheeses, yoghurts and sour milk. The comparative advantage of the local industry (over foreign companies) is that their products meet the specific taste and consumption habits of domestic consumers. Yet these products do not have high profit rates. At the same time, the local industry has major difficulties competing with foreign companies, especially with the more profitable value added dairy products. Dairies are generally much too small to invest in product development and to face international competition in product segments like milk-based beverages, ice cream and cheeses.

4. Conclusions

With yields per cow and gross margins (far) below average EU-15/25 levels, the competitiveness of the 'average dairy farmer' in the NMS, CC and PCC seems particularly weak. However, the 'average' position is strongly affected by the fact that the primary dairy sector is characterised by many subsistence and/or small-scale farmers. Most of these farmers are not expected to improve on their subsistence level in due time. Consequently, they will not be vertically integrated into the modern supply chain as their inclusion depends on their ability to comply with EU rules on food safety and health issues, which require investment levels that exceed their capacity to generate the means by themselves or to borrow from banks. Hence, a further restructuring of the sector is very likely in the years to come.

Yet, there is also a group of countries in which dairy farming differs significantly from the features mentioned above. Milk production in the Czech Republic, Slovakia, Cyprus and Malta is typically large-scale, with relatively high yields per cow and (except for Malta) a reasonable gross margin rate of return on total revenues. In these countries, practically all milk produced is processed by the industry, which has, however, difficulties competing with imports of high value dairy products.

The statistical base for a thorough performance assessment of the dairy processing sector is weak in most NMS. The data available, however, provide some useful indications of trends in productivity, value added, sales, product differentiation and market positions. Positive developments are shown most clearly – and sector wide – in the dairy industry in Poland and the Baltic countries. On the other hand, the dairy industry in the Czech Republic, Slovakia, Hungary and Slovenia is losing market shares. Competitiveness of the dairy industry in Romania and Bulgaria typically suffers from the generally low quality of milk supplied by the majority of farmers and the low number of dairies complying with EU food safety and quality standards. The industry in these two member states faces a huge financial challenge to upgrade their facilities technically, increase efficiency, improve the quality and variety of their product portfolio and enhance their marketing skills and results. EU support funds can be helpful, but most investment should come from the private sector itself.

Chain linkages are particularly weak in CC and PCC: except for Croatia, only a small fraction of the milk produced is being processed in these countries. Next to the highly fragmented small-scale structure of the primary level, the lack of good quality milk is a major barrier to the enhanced competitiveness of the dairy supply chain in these countries. Assessments of the economic situation in the sector fall short due to available statistical data. Yet, it is clear that technology updates and skills improvements are necessary to improve yields, gross margins, labour productivity and quality of produce at both the farm and industry levels.

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