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THE EU ENLARGEMENT AND THE DAIRY SECTOR: POTENTIAL IMPACTS AND PERSPECTIVES

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ABSTRACT

A descriptive and comparative analysis is given of the dairy sectors of the eight CEECs, which recently acceded in the EU. Four scenarios were developed and applied to a dairy simulation model, which was developed for the enlarged EU. The results indicate that the quotas will become directly binding for all CEECs at the moment quotas are in effect. If quota will remain fixed over time whereas demand is expected to grow, the EU's dairy surplus will diminish anyway and in the long run the EU might even become a net-importer. A 20% quota increase for the CEECs will lead to less extreme milk prices, but quotas remain binding. Dairy demand will increase with GDP growth, but is negatively influenced by upward price adjustments occurring in the CEECs due to the accession. Additional GDP growth of 2% will increase net dairy exports from the EU-15 to the CEECs. Abolition of export subsidies and quotas will lead to supply growth and increasing net exports of the EU.

Keywords: EU enlargement, Central and Eastern European Countries, Luxembourg Agreement, dairy sector

1 INTRODUCTION

The enlargement of the European Union (EU) has a major impact on agriculture as the Common Agricultural Policy (CAP) now also applies to the new member states (NMS). Eight out of the ten NMS are Central and Eastern European Countries (CEECs), jointly producing about 20% of the total EU-15 milk production. However, large differences exist between the eight CEECs and the EU-15 in prices, production methods, milk yields, product quality, farm structures, farmers' and consumers' income, etc. The gaps are expected to decrease over time, under the newly implemented CAP-policy reform (Luxembourg Agreement), which for the dairy sectors in the CEECs mainly includes the introduction of intervention prices, quotas, premiums, and quality regulations.

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The present study, which has an exploratory character, concentrates on the eight acceding CEECs: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. The next section gives a descriptive analysis of the dairy sector in these countries, showing that they are at different levels concerning the characteristics mentioned before. They have in common the large reduction in production after the Soviet Union fell apart in 1990. Production gradually increased since then, but has never reached previous levels. Tough negotiations have resulted in tight quotas that had to be implemented in the eight CEECs on April 1, 2004. For most countries this means that they have to limit their production as compared to the production in 2000. Poland and Slovenia have an exemption from super-levy in the first year (WAITE AND TRAYNOR 2004).

The eight CEECs will receive a special restructuring quantity of quotas in 2006, although they are limited. Besides that, following the Luxembourg Agreement, the quotas will be increased by 0.5% starting in 2004 for the first three years in all member states (except Ireland, Italy, Spain and Greece). After that the quotas will be increased by 1% in all member states for two years. As a compensation for the announced reduction in intervention prices of butter (25%) and skimmed milk powder (15%), direct payments will be phased in gradually.

Based on these policies, and the variation in several key variables, i.e. technical progress, growth rates of gross domestic product (GDP), and population growth, a number of scenarios are formulated and subsequently analysed using a partial equilibrium simulation model. Section 3 describes further details of the policies, scenarios and the model. Section 2 provides a brief descriptive analysis of the CEEC dairy sectors, whereas Section 4 contains the simulation results and their discussion. The paper concludes in Section 5, by comparing the results of the scenarios in the model. Jointly, these scenarios provide a first insight into the likely impacts of the accession of the new member states to the EU on the EU dairy sector. Moreover, they highlight the sensitivity of the enlargement impacts with respect to several key parameters.

2 DESCRIPTIVE ANALYSIS OF THE DAIRY SECTOR IN THE 8 CEECS

2.1 Milk production & farm structure

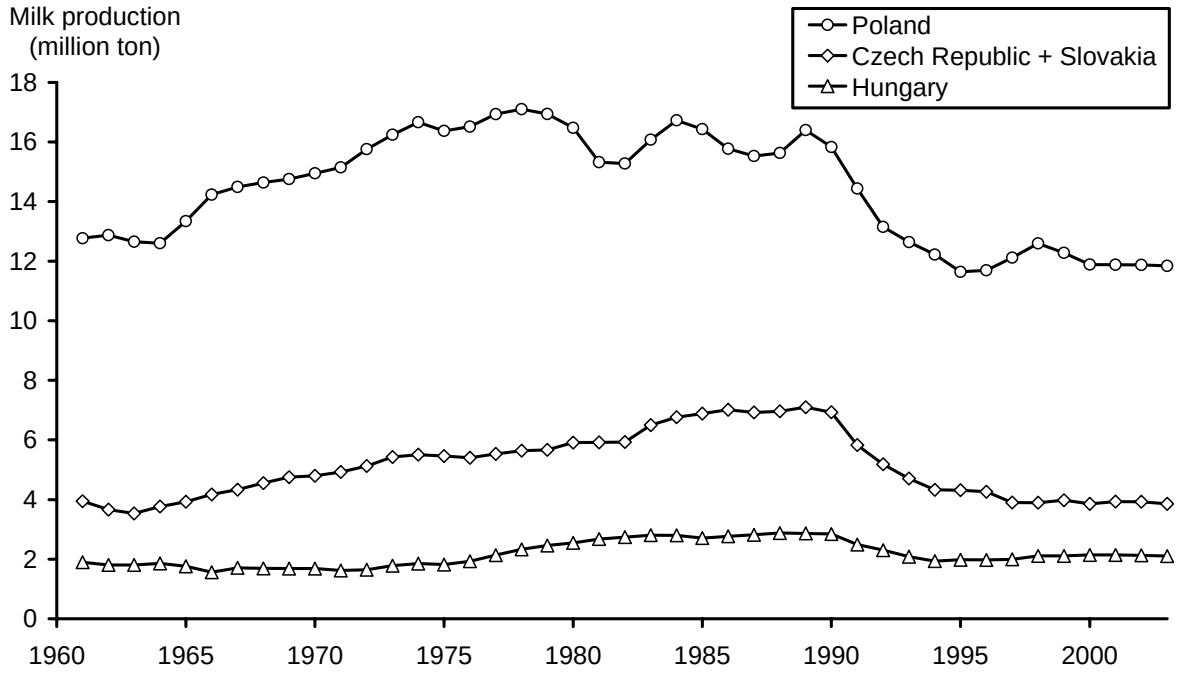
Poland is by far the largest acceding country in terms of population, area and milk production (11.8 million ton in 2003 or 55% of the total production in the eight CEECs). However, the average milk yield of Poland is just below the average of the eight CEECs, and about 70% of the average yield in the EU-15 (6.1 t/cow in 2003). This is probably because there is a large amount of very small non-specialised farms in Poland as compared to Hungary and Czech Republic, producing partly for own consumption and using mainly grasslands for feed. The two countries among the eight CEECs with the highest average yields,

Czech Republic and Hungary (about the EU-15 average), are the second and third largest milk producers, respectively, in the group. In these countries there are many large collective and cooperative farms, which use more modern technologies and use concentrated feedstuffs as an important part of the feed (TONINI & JONGENEEL 2002). According to AGRA EUROPE (2004), 95% of Hungary's milk production met the EU hygiene standards, and similar high levels were reached in Czech Republic. Hungary and Czech Republic also stand out in their relatively large share of rural area and population density.

The total production of four important dairy-producing CEECs (Poland, Hungary, Czech Republic and Slovakia) increased during the sixties and seventies and fluctuated at a high level during the eighties (Figure 1). In 1991, there was a large fall in milk prices and production decreased enormously, partly because of decreased yields, but mainly because of a decrease in livestock numbers. Especially for Poland, this was a large shock for dairy production. However, production and yields have been increasing steadily since the mid-1990s.

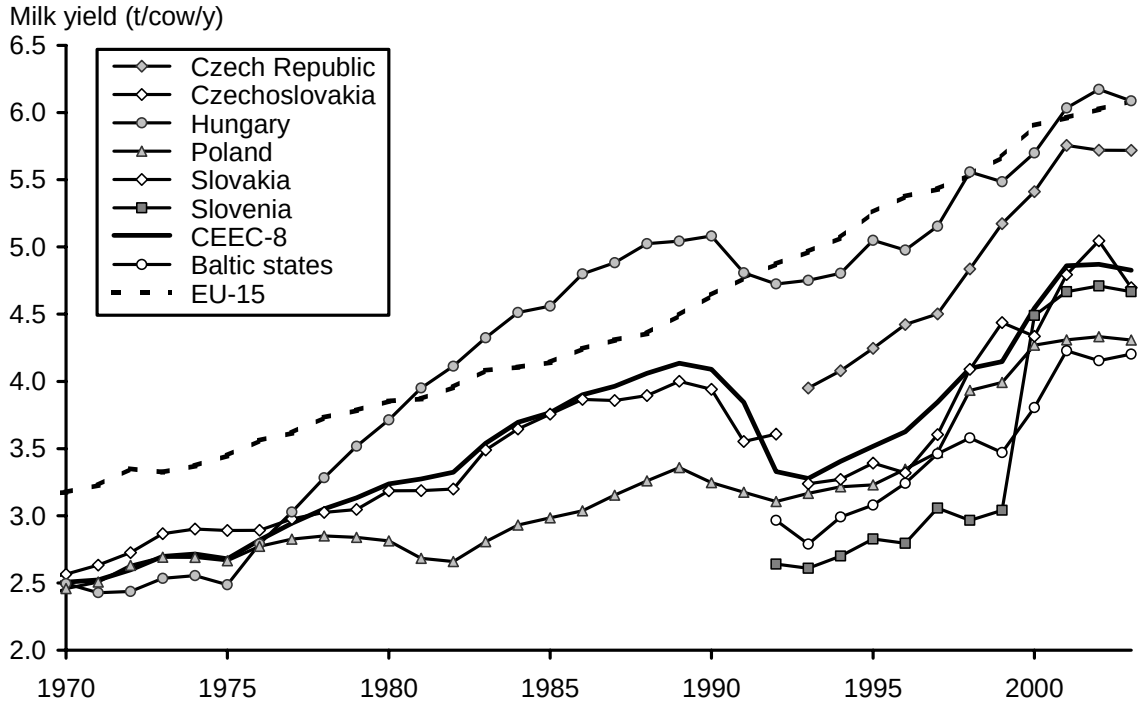
The differences in average yield between most of the eight CEECs and the EU-15 is still large (Figure 2), which means that still a large increase in yield is possible and expected. Apart from investments in new technologies (genetic material, machinery, feedstuffs), there is a tendency for changes in farm structure towards a more even distribution of agricultural area to producers, like in the EU-15 (LERMAN 1999). Especially in the countries where small farm structures predominate, the pressure of the EU quality standards is thought to force the farms to either quit or expand production (AGRA EUROPE 2004). The price-increase in the eight CEECs will be an incentive for the producers. However, the restrictive quotas that were allocated (see also Section 3) will limit expansion of production and probably influence farm size restructuring.

Figure 1: Total milk production of Poland, Hungary, and Czech Republic + Slovakia between 1961 and 2003



Source: FAOSTAT (2004)

Figure 2: Average milk yields of the 8 CEECs, its total average and the total average of the EU-15, between 1961 and 2003



Source: FAOSTAT (2004)

2.2 Dairy market & processing industry

A significant part of the milk production in the eight CEECs is not processed in the dairy industry but consumed by the farm family or the unprocessed milk is directly marketed. In Latvia, Lithuania and Poland, only about 45% to 65% of the milk production goes to dairies. Reasons for this can be the low quality of the raw material and high milk collecting costs (HARTMANN 2001). A large part of the production in these countries takes place in small scale subsistence farming, which is reflected in a large share of the labour force being employed in agriculture in small scale farms (15 to 20% compared to 5 to 10% in the other CEECs). Czech Republic, Slovakia and Hungary deliver almost at the same share of the milk as the EU-15, which is about 95%. In these countries, the dairy processing industry is relatively well developed and modernized. Some of this is enabled by foreign investors, who have considerably expanded the dairy industry in the eight CEECs in recent years (JONGENEEL AND TONINI 2002). For example, the multinational "Nutricia Dairy" is the market leader in Hungary with an 18% share of milk processing. On the other hand, there are a number of domestic investors, like "Madeta", which is the market leader in Czech Republic, holding a quarter of the milk market (AGRA EUROPE 2004). As compared to the developments taking place in Czech Republic, Slovakia and Hungary the dairy industries in Slovenia and Estonia are still lagging behind.

2.3 Consumption & international trade

Consumption of milk in the CEECs declined considerably in the nineties. Unlike in the other countries, in Slovenia and Lithuania milk consumption recovered concurrently with the meat consumption. In Slovenia, income increase in the late nineties and beginning of this century has probably led to increase in consumption of processed milk. In Lithuania, the situation was completely different. There an increased number of small family farms (holding only a few cows) could explain the increased milk consumption (ABELE et al. 2004). In recent years, increase in welfare in the CEECs has led to an increase in demand for high value products like cheese. Because of a relatively low consumption levels in the CEECs as compared to the EU-15 (table 1), the CEECs have started to export their dairy products to the EU-15 since a couple of years. Czech Republic, Lithuania, Slovakia and Slovenia are the most important net dairy exporters. This has increased considerably following the introduction of the 'double zero' agreement. According to AGRA EUROPE (2004), consumption of dairy products is expected to decline further as the prices increase in the eight CEECs, leading to even higher exports.

Table 1: Consumption of liquid milk, butter and cheese

	Liquid milk			Butter			Cheese		
	kg per capita								
	1999	**2000**	**2001**	**1999**	**2000**	**2001**	**1999**	**2000**	**2001**
Czech Republic	76.2	73.2	75.0	3.9	4.1		9.3	10.5	10.2
Hungary	87.5	90.0	84.8	0.8	0.8	0.6	9.4	10.1	9.0
Poland	85.0	83.0	82.0	3.6	3.4	3.9	11.4	11.3	
Slovakia	81.5	81.5	81.8	3.0	2.7	2.7	10.7	5.7	6.2
Slovenia	68.4	73.3	72.5	1.0	0.8				
Estonia	71.2	75.1		2.1	2.1	2.2	8.4	9.0	8.9
Latvia				2.2	1.6	1.9	3.6	4.2	7.9
Lithuania				2.9	3.0				
EU-15	95.6	95.0	96.4	4.6	4.6		17.9	18.3	18.6

Source: IDF (2002)

3 DESCRIPTION OF THE MODEL

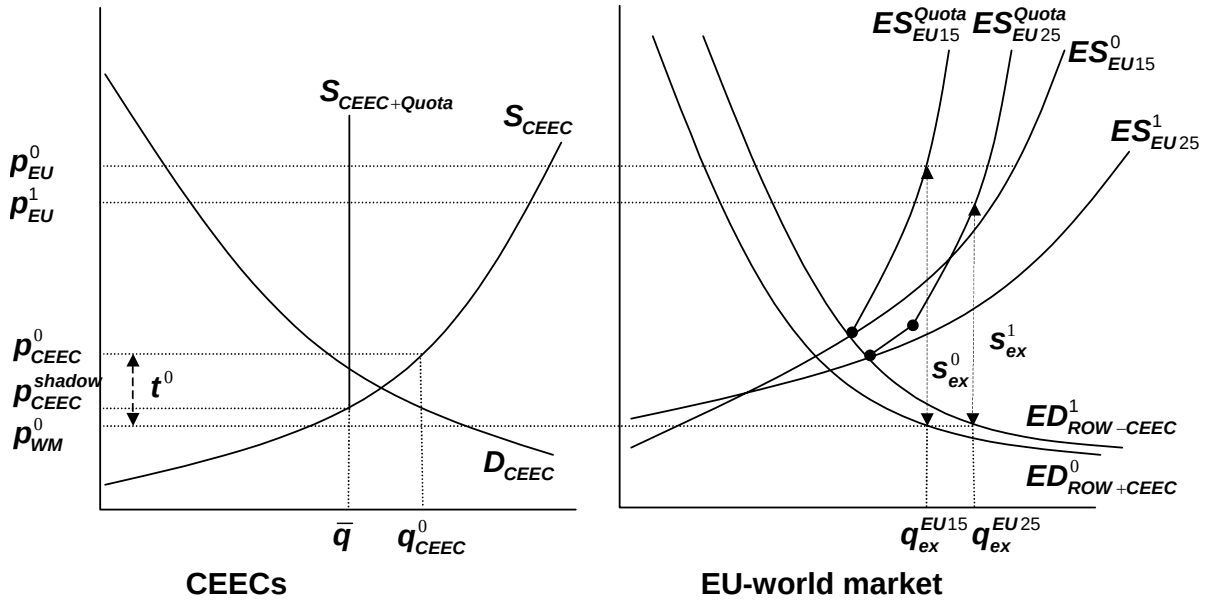
3.1 Theory

The impacts of the accession of the CEECs to the EU can be analysed with a simple partial equilibrium model, which is graphically illustrated in Figure 3 below. The pre-accession dairy market in the CEECs is characterised by a domestic demand and supply equation, which are at equilibrium at (q^0_{CEEC}, p^0_{CEEC}) (see Figure 3, left panel). The average pre-accession price level in the CEECs is higher than the world market price due to support measures introduced after the initial liberalisation of the early 1990s to compensate for the difficult market conditions (KASPERSSON et al, 2002, 26). In the graph this is reflected by tariff (and export subsidy) t^0. It is assumed that for the ease of exposition that before the accession the CEECs are exporting to the world market, therewith influencing the excess demand curve faced by the EU-15 at this market (see right panel $ED^0_{ROW+CEEC}$). The main direct impacts for the CEECs of accession are the introduction of milk quota and the milk price increase and inclusion of the CEECs in the EU. The milk quota restricts milk output at a level below the pre-accession production level (cf. Table 2 and Table 3 below). In Figure 3, the milk quota is represented by a vertical line at $\bar{q}$. With the accession the milk price increases from p^0_{CEEC} to the EU price level p^0_{EU}.

The impact of the EU enlargement on the world dairy market is illustrated in the right panel of Figure 3. This panel shows the excess milk supply of the EU, as

well as the excess demand of the rest of the world, which initially includes the (negative) net excess demand of the CEECs (see $ED^0_{ROW+CEEC}$). Because in the EU-15, there already exists a milk quota scheme, the relevant excess supply curve is ES^{Quota}_{EU15}. As a consequence of the enlargement both the EU's excess supply as well as the rest of the world's excess demand change. The new relevant excess supply curve includes the CEECs and is represented by ES^{Quota}_{EU25}, which is the sum of the excess supply curves of both the EU-15 and the CEECs (see shift from ES^{Quota}_{EU15} to ES^{Quota}_{EU25}). (The kinks in the excess supply curves arise from the milk quota in both the EU-15 and new member states). Because after the accession the CEECs are now integrated in the EU they have to be taken out of the initial excess demand curve, as a consequence of which the excess demand curve at the world market shifts slightly to the right (see $ED^1_{ROW-CEEC}$).

Figure 3: Simplified representation of the supply and demand curves of the CEECs (left panel) and the EU-worldmarket (right panel) (for explanation of the symbols, see text)



As a consequence of the Agenda 2000 and the Luxembourg Agreement of 2003 on the Midterm Review, the milk price will decline over time. This is reflected in Figure 3 by a milk price reduction from p^0_{EU} to p^1_{EU}. This price decline has a positive effect on domestic dairy consumption in the EU and will lead to a reduced excess supply. The net result of the enlargement and price decline is an increase of EU net exports from q^{EU15}_{ex} to q^{EU25}_{ex}. The market will only take up this export an export subsidy bridging the gap between EU and world market price levels available. As a consequence of the reduced price support in the EU the export subsidy can be lowered from $s^0_{ex} = (p^0_{EU} - p^0_{wm})$ to $s^1_{ex} = (p^1_{EU} - p^0_{wm})$. In the graph the world market price does not change as a consequence of the enlargement and EU dairy policy reform. Of course depending on the quota restrictions

and EU price support level the world market price might shift in downward or upward direction.

Other dynamic effects, not considered in the Figure, are the over time the shifts of demand and supply to the right due to income increase and population growth at the demand side and technological progress and milk yield increase at the dairy sector. In terms of Figure 3 (right panel), the consumer demand increase can be interpreted as an inward shift of the excess supply curve. The supply side shifters will move the supply curve to the right (see Figure 3, left panel) and will as such drive the CEEC's shadow price down over time, therewith increasing the value of the quota rents (with rent equal to $p_{EU}^{1} - p_{CEEC}^{shadow}$).

Table 2: Milk quotas in each of the 8 CEECs and in the EU-15 between 2003 and 2015

	Agreed quota	2004/05	2005/06	2006/07	2007/08	2008/09-2014/15	Change
	Actual quotas (1000 tonnes)						%
Czech Republic	2 682	2 696	2 709	2 778	2 805	2 832	5.6
Estonia	624	628	631	656	662	668	7.0
Hungary	1 947	1 957	1 967	2 019	2 039	2 058	5.7
Latvia	695	699	702	739	746	753	8.3
Lithuania	1 647	1 655	1 663	1 730	1 746	1 762	7.0
Poland	8 964	9 009	9 054	9 515	9 604	9 694	8.1
Slovakia	1 013	1 018	1 023	1 056	1 066	1 076	6.2
Slovenia	560	563	566	585	591	596	6.4
Total CEEC-8	17 574	17 661	17 749	18 492	18 668	18 844	7.2
Total EU-15	118 893	119 374	119 855	120 335	121 539	122 742	3.2

Source: AGRA EUROPE (2003)

3.2 Data & calibration

The year 2000 was used as the base year for the model[1]. Table 3 gives the most important base year data, including growth rates and trends. Data were taken from FAOSTAT (2004), EUROSTAT (2004), and ZMP (2003). As Table 3 shows, there is considerable variation in milk prices, with production weighted average milk price for the CEECs of about €0.20 per kg[2]. For the base year, the average

[1] Details about the model structure, which roughly follows a constant elasticity approach, are available from the authors upon request.

[2] In the simulation the price differentials are assumed to be a function of the self-sufficiency rate and transport costs on the one hand and of the raw milk quality level on the other

gross domestic product (GDP) of the years 1999 to 2001 was used. The income growth is the average of the yearly GDP growth rates between 1998 and 2002. The population growth is the average of the annual growth rates between 1995 and 2002. Technological progress estimates (kilogram milk yield increase per cow per annum) are based on regression analysis over the period 1993 and 2001 and exclude the impact of milk and feed prices on yields (all estimates were statistically significant).

Table 3: Base year data (2000)

	Raw milk supply	Raw milk price	Feed input	Dairy cow stock	Land input	Yield increase
	1 000 ton	€/kg	1 000 t cpd	1 000	1 000 ha	kg/y
Czech Republic	2 708	0.2	3 600	547	4 280	177
Estonia	629	0.11	210	131	986	189
Hungary	2 080	0.25	5 600	380	5 853	134
Latvia	823	0.15	170	205	2 540	160
Lithuania	1 725	0.15	330	494	3 489	115
Poland	11 900	0.19	4 600	3 047	18 397	114
Slovakia	1 099	0.18	1 250	246	2 444	146
Slovenia	649	0.27	530	128	486	206
EU-15	118 392	0.33	125 000	20 287	130 004	

hand. The milk quality is assumed to converge to minimum EU standard quality over time:

$$P_{c,t} = P_{EU,t} + \left(\left(1-f_{q,t}\right)/\left(1-f_{q,2000}\right)\right)\cdot\left(P_{c,2000}-P_{EU,2000}\right)$$

Where: P=price; c=country; t=time; f_q= share of milk delivered to dairies over the share of milk delivered to dairies in the EU. The share of milk delivered to dairies is an indicator for milk quality. It is increased from 2004 onwards by 0.01 in Czech Republic, Slovakia and Hungary, 0.02 in Estonia, Lithuania, Poland, and Slovenia, and 0.025 in Latvia, which results in values for f_q between 0.8 and 1 in the year 2016.

Table 3: Base year data (2000) (*continued*)

	Dairy producers	Raw milk demand	Consumers	Income	Income growth	Population growth
	1 000	1000 t me	1 000	PPS €/cap	%/y	%/y
Czech Republic	3.9	2 258	10 275	13 200	1.58	-0.118
Estonia	3.2	622	1 361	8 600	4.76	-1.088
Hungary	33	2 147	9 973	11 500	4.32	-0.41
Latvia	75	836	2 351	6 700	5.68	-0.978
Lithuania	225	1 202	3 681	7 500	4.56	-0.399
Poland	1200	10 794	38 629	8 900	3.06	0.01
Slovakia		1 016	5 403	10 800	3.18	0.093
Slovenia	47	525	1 995	15 600	3.9	-0.035
EU-15	734	110 647	379 449	22 530	2.42	0.347

Notes: cpd = crude protein digestibility; me = milk equivalent; PPS = purchasing power standard; cap = capita

Source: FAOSTAT (2004), EUROSTAT (2004), and ZMP (2003)

Table 4 gives the elasticity values for the CEECs, the EU-15 and the rest of the world (ROW). With respect to raw milk supply, Nerlovian milk supply equations were estimated at individual country level, with milk supply being a function of the milk price, the lagged dependent variable and a trend variable. The estimation period was 1993-2001, and the obtained production weighted average short-run supply elasticity for the CEECs as a whole was 0.22 and the long-run elasticity was 0.52. Although the signs of the milk price response were in general according to expectations (except for Czech Republic), significance levels were unsatisfactory (this did not improve when alternative specifications were used). We assumed a supply elasticity value of 0.3, which is between our upper and lower estimates (intermediate-run). This supply elasticity estimate is similar to the supply elasticity for the CEECs used in the SWOPSIM model (GARDINER et al. 1989).

The milk supply elasticity for the ROW and the milk demand elasticities for the CEECs and the excess demand of the ROW are estimates based on GARDINER et al. (1989). The supply and demand elasticities used for the EU-15 are based on simulated (medium term) elasticities with the INRA-Wageningen model (BURRELL AND JONGENEEL 2001). Estimated values for milk yield elasticities to changes in milk price/feed price ratio were small but not significant. Because low values are expected and the outcome of the model is not sensitive to this parameter, it is assumed to be 0.05 for the eight CEECs (where there is room for improved feeding practices) and zero for the EU-15.

Table 4: Elasticity data of the CEECs, EU-15 and the ROW

	CEECs	EU-15	ROW
Milk supply			
Milk price	0.30	0.30	
Milk demand			
Milk price	-0.35	-0.30	-2.50
Income per capita	1.00	0.25	1.30
Milk yield			
Milk price / feedstuff price	0.05	0.00	

Source: based on GARDINER et al. (1989) and BURRELL AND JONGENEEL (2001)

3.3 Scenarios

Four scenarios are analysed, of which the first follows the dairy policy as defined in the Luxembourg agreement, whereas the other scenarios consider relaxation of the quota constraints, and gross domestic product (GDP) growth.

A) Scenario A is the base scenario, which means that all scenarios include the settings as in this scenario unless otherwise specified. Here, quotas are imposed in six CEECs in 2004 and in Poland and Slovakia in 2005. The quotas are increased as in most EU-15 countries, based on the Luxembourg Agreement (0.5% between 2005 and 2007, and 1% in 2008 and 2009). This includes the special restructuring quotas, which will be added in 2006. The quantities of the restructuring quotas were fixed for each CEEC, based on analysis of the milk sector in each country. Intervention prices are gradually decreased with 25% between 2004 and 2007 for butter and 15% between 2004 and 2006 for skimmed milk powder (SMP).

B) In scenario B, we increase the quota gradually with 20% between 2005 and 2009 in the CEECs (annually 4% of the quotas in 2004). With this amount of quotas, in most of the CEECs production levels can increase to the amount produced in the year 2000.

C) Scenario C is almost the same as scenario A. The difference is that it includes additional 2% per annum GDP growth rate for all CEECs. The additional GDP growth can be interpreted as an estimate of the macro-economic dividend from accession.

D) In Scenario D, the intervention prices for butter and SMP are decreased in such a way as to completely remove the export subsidies. Therefore the intervention prices of butter and SMP were gradually decreased by respectively

35% and 25% over the period 2004-2007. In 2007, when the export subsidies are zero, the milk quotas are abolished[3].

4 RESULTS & DISCUSSION

The milk supply, demand, dairy stock, and yield in 2004, 2010 and 2016 compared to 2000 (=100%) and milk price in € per kg and net exports (in million tons) of the EU-25 in 2000, 2004, 2010 and 2016, according to the four different scenarios are given in Table 5 (Detailed results at CEEC member state level can be found in Annex 1). The results of the model indicate that the quotas will become directly binding for all CEECs at the moment the quotas are applied. This effectively curbs the growth of EU dairy production. At the same time the shadow price is driven below the market price, giving rise to quota rents of about €0.07 per kg milk in 2004, which are increasing thereafter.

As a consequence of the tight quota allotment, it is expected that satisfying current WTO constraints on subsidized exports will not create serious problems. If quota will remain fixed over time whereas demand is expected to grow, the EU's dairy surplus will diminish and in the long run might even become a net-importer. This is the case in scenarios A, C and even in scenario B, where quotas are increased by 20%. Although milk prices decrease scenario B, all quotas are still binding. The demand increases somewhat more in scenario B than in scenario A as a result of slightly lower prices.

Assuming a 2% extra GDP growth for the CEECs (Scenario C), dairy demand in the CEECs will increase by 85% in the year 2016 compared to about 40% in Scenarios A and B. This is irrespective the upward price adjustments. Additional GDP growth will increase net dairy exports from the old EU-15 to the CEECs and the total EU will become a net importer already in the year 2011. The higher prices will also have a slightly positive effect on the yield and as a result of this the dairy stocks will decrease somewhat further.

Scenario D shows that the abolition of export subsidies (by means of intervention price reductions for butter and SMP) leads to a considerable raw milk price reduction and a higher increase in milk demand than in scenario C. The market liberalisation scenario (D) leads to a milk price, which is €0.07 per kg (-21%) in 2010 and €0.11 per kg in 2016 (-30%) below the corresponding milk price in base scenario A. Abolishment of the quotas in 2007 under these circumstances will, however, still induce a production increase in the CEECs of 12% in 2010 and 27% in 2016. Instead of becoming a net importer, the EU-25 net export increases steadily, but still remains below the net export level of 2000. Within the EU-25, the eight CEECs will not be able to satisfy the increased demand and

[3] Adjustments in other dairy policy instruments (aimed at stimulating domestic dairy consumption are ignored.

still need to import from the EU-15. The world market price increases in this scenario from $0.22 per kg in 2000 to $0.25 per kg in 2016. Over time the EU milk price increases above the intervention price level (equal to €0.20 per kg from 2007 and onward) due to the increase in demand.

In particular for the quota abolition scenario, the height of the shadow prices is an important variable. With a supply elasticity of 0.3 the average shadow price is €0.065 per kg (-36%) below the market price when the quotas are imposed in 2004 (excluding Poland and Slovenia). This is considerably high. Lower supply elasticity, for example a value of 0.2, would lead to much lower shadow prices. Thus, the uncertainty about the milk supply elasticities has consequences for the shadow prices in the model results. However, the uncertainty with respect to the shadow prices should not be exaggerated. Low shadow prices suggest room for significant supply increases in case of quota abolition. However, since low shadow prices often go with low supply elasticities, a small increase in output already substantially drives up the shadow price.

In the simulations, feed and beef prices were kept constant. Sensitivity analysis with respect to feed and beef prices indicated that the results presented here are rather stable. However, since the beef price only affects the sector by the cross price elasticity of the milk supply function with respect to the price of beef, the interaction effects are very limited. For example, substitution between dairy cows and beef cows was not taken into account, whereas BURRELL AND JONGENEEL (2001) show that this linkage is important. At this point further research is required.

In scenario C demand for dairy products substantially increases, which is mainly due to the high income elasticity for dairy products in the CEECs. There still exists uncertainty with respect to the exact values of this parameter. However, ABELE et al. (2004) emphasise the importance of the income effect on dairy demand in the CEECs. Whereas AGRA EUROPE (2004) expects the milk price increase in the CEECs to lead to an increase in their net exports, our findings indicate that the (positive) income effect dominates the (negative) price effect, causing all CEECs to become or remain net importers of dairy products. This holds in all scenarios, although it does not exclude that some individual CEECs will be net exporters. A limitation of the current simulation model is that it treats demand in terms of milk equivalents and not in terms of differentiated dairy products.

Table 5: Milk supply, demand, dairy stock, and yield in 2004, 2010 and 2016 compared to 2000 (=100%) and milk price and net exports of the EU-25 in million tons in 2000, 2004, 2010 and 2016, according to the four different scenarios (A: status quo; B: 20% extra quota; C: 2% extra GDP increase; D: export subsidy and quota abolition)

	Scenario				Scenario			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**
	Milk supply (2000=>100%)				**Milk demand (2000=>100%)**			
2004	103	102	103	102	110	110	118	110
2010	90	101	90	112	125	126	150	141
2016	90	101	90	127	139	140	185	160
	Dairy stock (2000=>100%)				**Yield (2000=>100%)**			
2004	90	90	90	90	114	114	114	114
2010	66	73	66	84	137	137	137	134
2016	56	63	56	82	160	160	160	156
	Net export EU-25 (million t)				**Net export CEEC-8 (million t)**			
2000	15.5	15.5	15.5	15.5	2.2	2.2	2.2	2.2
2004	11.0	11.0	10.1	11.0	0.8	0.7	-0.6	0.7
2010	3.1	4.4	0.1	9.7	-4.8	-2.7	-9.6	-3.1
2016	-2.9	-1.5	-8.6	10.2	-7.5	-5.3	-16.5	-3.6
	Milk price EU-25 (€/kg)				**Milk price CEEC-8 (€/kg)**			
2000	0.31	0.31	0.31	0.31	0.19	0.19	0.19	0.19
2004	0.32	0.32	0.32	0.32	0.21	0.21	0.21	0.21
2010	0.33	0.32	0.35	0.25	0.25	0.25	0.26	0.18
2016	0.37	0.36	0.40	0.26	0.32	0.31	0.34	0.21
	Shadow price EU-25 (€/kg)				**Shadow price CEEC-8 (€/kg)**			
2000	0.24	0.24	0.24	0.24	0.19	0.19	0.19	0.19
2004	0.21	0.21	0.21	0.21	0.18	0.18	0.18	0.18
2010	0.18	0.18	0.17	0.25	0.11	0.13	0.09	0.18
2016	0.14	0.14	0.14	0.26	0.09	0.10	0.07	0.21

Source: own calculations

5 CONCLUSIONS

The results of the model described in this exploratory paper demonstrates that under the present EU policies for the dairy sector in the enlarged EU, demand

for milk and dairy products in the CEECs will increase, even though prices will rise considerably. Quota extension of 20% in the first 5 years after the introduction of quotas in the CEECs (not in the rest of the EU) would have little effect compared to the quota extensions that are proposed at the moment. In all cases where quotas remain in place, and even more in case with the income growth in the CEECs being higher than the current trend, the enlarged EU will in the long run become a net importer of dairy products. As such a prudent quota expansion policy will help the EU to satisfy WTO constraints on subsidized dairy exports.

A fourth scenario was introduced to investigate the potential impact of a complete liberalisation of the EU dairy markets (zero export subsidies, no quota constraints). Further reduction of intervention prices for butter and SMP in order to reduce the export subsidies to zero by the year 2007 results in a much lower milk price. Under these circumstances, quota restrictions can be abolished. Both production and consumption is likely to increase and net export from the EU to the rest of the world would continue to increase towards previous levels.

The aim of this paper is to provide a first investigation of potential impacts and consequences of the EU enlargement for the dairy sector. First, it should be realized that in particular the demand side was modelled in a rough way by aggregating all dairy products in terms of milk equivalents, therewith loosing a lot of detail at the demand side. Further research is necessary to get reliable estimates of the model parameters based on empirical analysis. In the studies currently available, and also in this study, most parameters were calibrated based on previous studies (which often themselves have a weak empirical basis). Moreover further analysis is required with respect to the functioning of the quota system (in particular with respect to the ‘direct sales’-milk not delivered to dairies). Finally, more attention should be paid to the dual structure of the dairy sector in a number of CEECs and the impact this has on sectoral adjustment dynamics. The current study did not take this into account.

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