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Foreword

This report provides a comprehensive quantitative assessment of possible implications of an EU dairy policy reform, with an explicit focus on regional effects of a milk quota abolition in the EU-27 in the year 2015.[1]

The report forms part of the project "Economic Impact of the Abolition of the Milk Quota Regime – Regional Analysis of the Milk Production in the EU" (AGRI-2007-0444), initiated by DG Agriculture and Rural Development (DG AGRI). The project was carried out from December 2007 until February 2009 by the European Commission's Joint Research Centre - Institute for Prospective Technological Studies (JRC-IPTS, Spain) in cooperation with EuroCARE (Bonn, Germany) and the collaboration of the Agricultural Economics Research Institute (LEI, the Netherlands) and the Catholic University of the Sacred Heart (Unicatt, Italy).

The CAPRI (Common Agricultural Policy Regionalised Impact) model used in this study is an agricultural sector model that combines a representation of agricultural supply based on positive mathematical programming with a global trade model for agricultural commodities. The supply module of CAPRI covers the most important agricultural activities in the EU-27 at a regional level (NUTS 2). The market model provides market feedbacks to farm gate prices for changing farmer behaviour and allows simultaneously the simulation of policy changes at the market level.

By the time this study has been elaborated, the milk market has shown a high dynamic, with relatively high milk prices in the year 2007 declining since spring 2008. This decline in milk prices could not be entirely incorporated in the modelling due to its unforeseen magnitude. In November 2008 the EU agriculture ministers reached a political agreement on the CAP Health Check, following the European Commission's originally proposed 1% milk quota increase every year between 2009 and 2013. Moreover, the ministers confirmed that the milk quota system will be abolished in 2015.

We thank Wolfgang Britz and Andrea Zintl (both University of Bonn, Germany) for different types of technical support and Christine Möller and Bence Tóth (both DG AGRI) for their detailed and valuable comments. Expert information on various countries has been kindly provided by Abele Kuipers (LEI, Wageningen University and Research Centre in the Netherlands), Heikki Lehtonen (MTT, Finland) and Thia Hennessy (Teagasc, Ireland). Sole responsibility for remaining shortcomings of this report rests, of course, with the authors.

1 A preliminary version of this report is published on the website of the European Commission's DG Agriculture and Rural Development (http://ec.europa.eu/agriculture/analysis)

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List of Abbreviations

ACP	Africa, Caribbean, and Pacific
AGMEMOD	Agricultural Member State Modelling
CAP	Common Agricultural Policy
CAPRI	Common Agricultural Policy Regionalised Impact
CAPSIM	Common Agricultural Policy SIMulation
CMO	Common Market Organisation
EBA	Everything but Arms
EDIM	European Dairy Industry Model
EU	European Union
EU-10	10 EU Member States of the 2004 enlargement
EU-12	12 EU Member States of 2004 and 2007 enlargements
EU-15	15 EU Member States before the 2004 enlargement
EU-2	2 EU Member States of the 2007 enlargement (Bulgaria and Romania)
EU-27	27 EU Member States after the 2007 enlargement
FADN	Farm Accountancy Data Network
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
HC	Health Check
IFCN	International Farm Comparison Network
LDC	Least Developed Countries
MFN	Most Favourite Nation
MS	Member States
MTR	Mid-Term Review
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
SAPS	Single Area Payment Scheme
SFP	Single Farm Payment
SMP	Skimmed Milk Powder
SPS	Single Payment Scheme
TRQ	Tariff Rate Quota
WMP	Whole Milk Powder
WTO	World Trade Organization

Executive Summary

Background

The dairy sector makes a substantial contribution to the agricultural turnover in many Member States (MS) of the European Union (EU) as well as in the EU as a whole. Nevertheless, within the EU-27, the size and importance of the dairy sector varies considerably between MS and across regions, basically reflecting climatic and other agricultural factors in the region concerned. The EU dairy market is regulated by the Common Market Organisation (CMO) for milk and milk products, of which the milk quota regime is one of the most noticeable elements. The EU milk quota system was originally introduced in 1984, in order to limit public expenditure on the sector, to control milk production, and to stabilize milk prices and the agricultural income of milk producers. Since the milk quota regime was introduced, milk quota has become a scarce production factor: on the one hand limiting milk production and, on the other hand, stabilising milk producer prices and maintaining dairy activities in less competitive regions. However, in the course of time European dairy policy has been continuously changing and has increasingly encouraged producers to be more market-oriented. Policy developments, including reductions of intervention prices and specific quota increases of various amounts to MS, together with most recent market developments, have provoked that quota is no more binding in some MS and regions of the EU. With the Luxembourg Agreement on the Mid-Term-Review (MTR) on 26 June 2003, the spotlight shifted again on the EU's milk quota regime, because the MTR stipulated that the milk quota system will come to an end in 2015. Within the Health Check of the Common Agricultural Policy (CAP) the European Commission endorsed the proposal of milk quota abolition and suggested an increase of quota by 1% annually from 2009 to 2013 to allow a "soft landing" of the milk sector to the end of quotas. In this context it is especially important to clarify, which economic effects can be expected of an abolition of the milk quota regime.

The current report is the last report of a series of three reports delivered to DG Agriculture and Rural Development (DG AGRI) within the project entitled "Economic Impact of the Abolition of the Milk Quota Regime – Regional Analysis of the Milk Production in the EU" (AGRI-2007-0444). The project aims at a thorough policy impact analysis of the EU dairy markets in the year 2020 regarding the removal of milk quotas within the framework of the Health Check of the CAP. This study has been led by the European Commission's Joint Research Centre - Institute for Prospective Technological Studies (JRC-IPTS) and provides a quantitative assessment based on different simulation scenarios performed with the CAPRI (Common Agricultural Policy Regionalised Impact) model and allows the comparison to results published in previous studies performed by the AGMEMOD, CAPSIM and EDIM consortia (Chantreuil *et al.* 2008; Witzke *et al.* 2008; Réquillart *et al*. 2008).

Within the project a significant amount of work was devoted to a rigorous update of the CAPRI model and database. The model updates were essential and comprised three objectives. The first one was to update the base year of the CAPRI system to a 2003-2005 three-year average. This was an important challenge due to the complexity of the CAPRI system and the problems to update world-wide supply and use tables from FAOSTAT. The second objective of the model update was the implementation of a formal link to an econometric framework for estimating marginal costs of milk producers. This additional module should increase the validity of the analysis, as it provides price-supply elasticities for raw milk based on historical FADN (Farm Accountancy Data Network) records (data up to year 2005) and actual estimates of regional quota rents (i.e. the difference between the farm milk price under quota and the marginal cost of production). The third objective of the model update was to incorporate expert data and medium-term projections on dairy commodities provided by the Directorate-General Agriculture and Rural Development (DG AGRI).

The profound update of the CAPRI model provides the basis for a comprehensive quantitative assessment of possible implications of the dairy policy reform, with an explicit focus on regional effects in the EU-27 of a milk quota abolition in the year 2015.

Specification of the Model

The CAPRI model is an agricultural sector model covering the whole of EU-27, Norway and Western Balkans at regional level (250 regions) and global agricultural markets at country or country block level. CAPRI makes use of non linear mathematical programming tools to maximise regional agricultural income with explicit consideration of the CAP instruments of support in an open economy. CAPRI consists of a supply and market module which interact iteratively. The supply module follows a 'template approach', where optimisation models can be seen as representative farms maximising their profit by choosing the optimal composition of outputs and inputs at given prices. Major outputs of the supply module are crop acreages and animal numbers at regional level, with their associated revenues, costs and income. The market module consists of a constrained equation system with a spatial world trade model. Major outputs of the market module include bilateral trade flows, market balances and producer and consumer prices for the products and world country aggregates.

The CAPRI version used for this study is standard comparative-static, i.e. adjustment costs are not considered and policy simulations reveal a situation where dairy farmers were given time to adjust their fixed factors to the new policy framework. By incorporating an econometric supply module for the most representative dairy farms in the EU, the update of the CAPRI model allows for a better representation of the dairy sector, as additional information on milk quota rents and price supply elasticities are now explicitly introduced for dairy products.

Scenario Description

Four scenarios are considered in the analysis:

- Scenario S1 corresponds to the ex-post base year scenario, which is constructed for year 2004 (i.e. 2003-2005 three-year average). It includes the full implementation of the Agenda 2000 reform, with 2003 agreements on the Mid-Term Review not being yet effective. This means that in this scenario the dairy and sugar markets were slightly more protective than after the Luxembourg Agreement in 2003 and direct payments were still coupled to production. Market access for developing countries was provided for by the "Everything but Arms" (EBA) agreement and the EU-10 (10 EU MS after the enlargement in 2004) and EU-2 (Bulgaria and Romania) were not yet fully part of the single market.

- Scenario S2 is a counterfactual simulation of the baseline policy applied to year 2004. It builds on the legislation ratified in year 2004, i.e. scenario S2 includes the central elements for the dairy sector of the Luxembourg Agreement in 2003, namely the decoupling of direct payments together with a stepwise reduction of intervention prices for butter and SMP. Furthermore it also includes further reforms on single markets (tobacco, olive oil and cotton sectors), the reform of the sugar quota, a 2% expansion of milk quotas in 2008 and the abolition of obligatory set-aside. Scenario S2 was mainly elaborated to show the impact of the 2003/2004 reform ex-post, i.e. more for technical purposes. Due to its high degree of abstraction and rather minor direct relevance to the analysis of milk quota abolition, results of scenario S2 are not further analysed in this report.

- Scenario S3 represents the baseline policy in year 2020. It assumes the same policy setting as scenario S2, i.e. the full implementation of the Luxembourg Agreement and further reforms mentioned in scenario S2. Moreover, scenario S3 includes expert-driven assumptions on the development of dairy markets and milk quota rents. For this scenario, DG AGRI provided statistical information on milk deliveries, export subsidies, intervention stocks for dairy products and, medium-term projections for dairy markets.

- Scenario S4 is conducted to represent the effects of a milk quota abolition. It is a counterfactual scenario to scenario S3, i.e. with other policy elements being equal to scenario S3, scenario S4 enables the comparison of possible differences between scenario S3 and a milk quota removal taking place in year 2015. As scenario results are generated for the year 2020, the dairy sector is assumed to have adjusted to the new market environment between 2015 and 2020.

Results and Conclusions of the Milk Quota Abolition Scenario

As an explicit focus of this report is on the regional effects in the EU-27 of a milk quota abolition in year 2015, conclusions can predominantly be drawn by comparing the results of scenario S4 and scenario S3. Results of scenario S1 are of a pure calibration nature (i.e. reproduction of statistical data) and are commented in the context of the baseline scenario within the report. As scenario S2 was mainly elaborated for technical purposes, results remain of a technical nature (i.e. ex-post behaviour of the model to policy changes in the baseline) and are therefore also not further commented in the report.

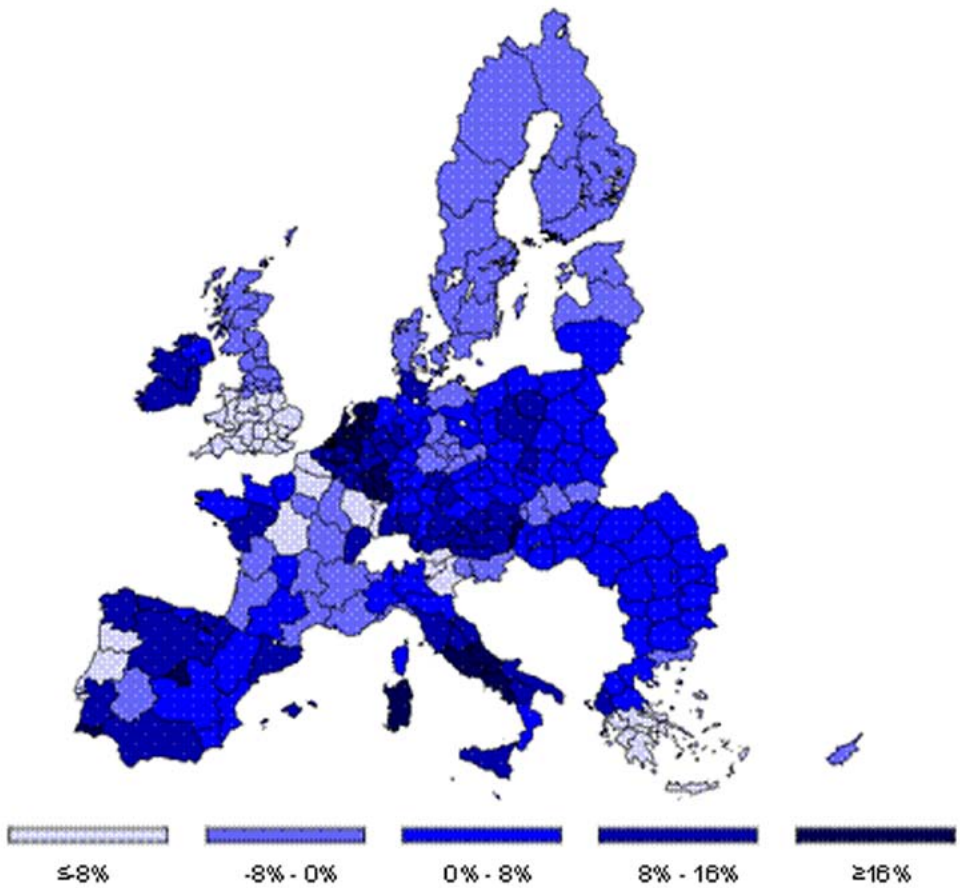
The results of scenario S4 are presented in relative terms to scenario S3, i.e. the baseline scenario in year 2020. Therefore, this analysis isolates the effects of the abolition of the milk quota system in the EU-27 on specific economic indicators at MS and regional level. Key results of scenario S4 are that milk production increases by about 4.4% in the EU-27, and EU raw milk prices decline by 10%. Production of butter, skimmed and whole milk powder would increase by 5-6% while their prices would decline by about 6-7%. The production of cheese and fresh milk products would increase by about 1% and their prices could decline by 4-6%.

At EU MS and regional level, the effects of milk quota abolition are quite diverse. MS like Austria, Belgium, Ireland, the Netherlands and Spain are projected to increase their milk production significantly, and with the exception of Spain, there is little heterogeneity among their sub regions. Within MS, projected changes in milk production are especially heterogeneous in Germany, France, Spain and the UK. In Germany a significant reduction of milk production is expected for the Eastern part, while most of the remaining regions expand their production, many even quite significantly. On average the German milk production is projected to increase by 7%. In the United Kingdom an overall reduction of milk supply by around -5.7% is projected, whereas this decline is more considerable in the southern part than in the north. The projected impacts on regional milk production are mainly determined by the estimated milk quota rents in the baseline scenario. Especially regions with high quota rents, such as in Austria (all above 28%), the Netherlands (all above 27%), Belgium (Brabant Wallon 38%, the rest above 28%), Luxembourg (29%), and to a lesser extent Italy (Lazio, Molise and Abruzzo above 33%) and Germany (Saarland, Koblenz and Rheinhessen-Pfalz above 32%) increase their milk production significantly. As the overall increase of milk production drives down dairy prices in the EU-27 this exerts economic pressure on regions with low quota rents, especially to be found in the United Kingdom (eastern, south east and south west regions), Sweden (Mellersta Norrland and Oevre Norrland) and all Finnish regions. The percentage change of milk production in European regions after quota abolition are visualised in the following map on a NUTS 2 level (see Map 1).

Comparing the average production changes in the (20%) most strongly expanding and receding countries in the EU-27, regional heterogeneity within EU MS is highest in Germany, Italy and Portugal; with the strongest heterogeneity expected in Portugal where Lisboa reduces milk production by -13% (in Lisboa the quota rent in scenario S3 was +1%) whereas the Algarve region increases production by 18% (the quota rent in scenario S3 for this region was +22%). In turn, regional homogeneity is highest within the Netherlands, Austria and Hungary, when comparing production changes in the 20% least expanding and receding countries.

The increase in cow milk production in the EU-27 is mainly due to a 4.2% increase in dairy cow herds. At MS level, increases in dairy herds between 11% and 20% are projected for the Netherlands, Austria, Belgium, Ireland and Spain. Concerning the NMS, the biggest increases in dairy cow herds are projected for Hungary (6.1%) and Poland (4.5%). The increase in dairy herds usually translates into a modest increase in cattle density, because other cattle types for fattening are not substantially affected and suckler cows will decline, as prices for calves are driven down by additional supply from dairy cows. In contrast, some MS face decreases in dairy cow herds,

Map 1: Percentage change of milk production in European regions after quota abolition on a NUTS 2 level



especially the United Kingdom, Sweden and France (-5.8%, -4.8% and -3.2% respectively). The only NMS with a mentionable decrease in dairy cow herds is the Slovak Republic (-2%).

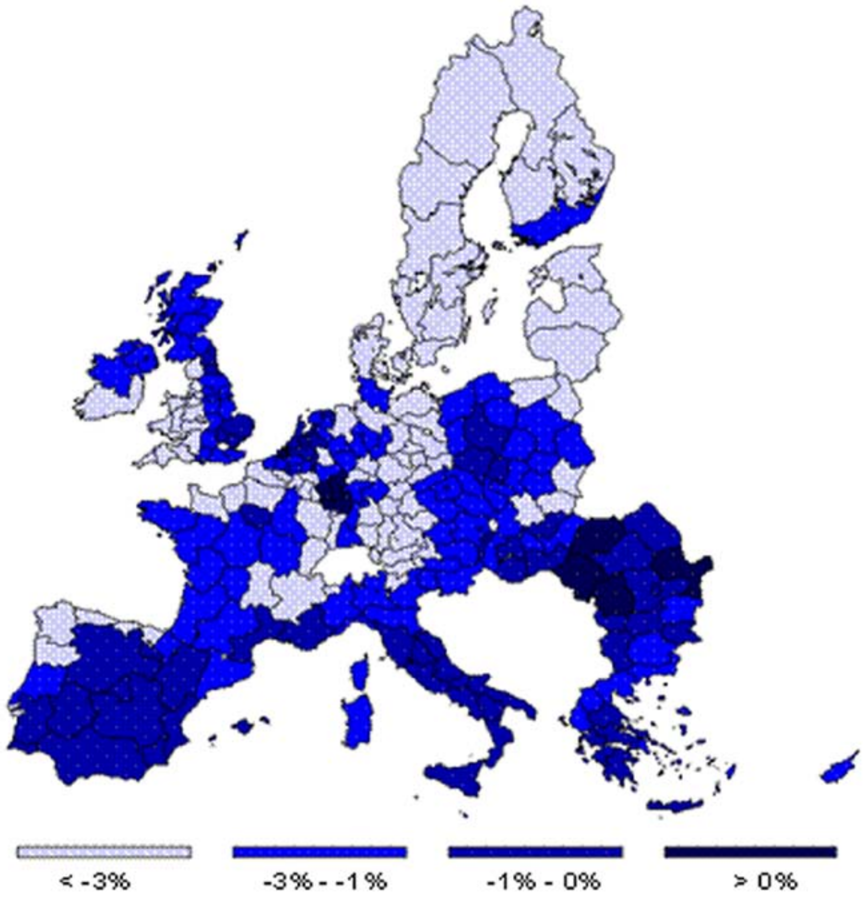
Regarding regional dairy cow herds, nearly 70% of the European regions show an increase in dairy cow herds as a consequence of quota abolition. Strongly increasing dairy herds of more than +16% can be observed in about 10% of the regional units, as for example Saarland, Rheinhessen-Pfalz, Koblenz and Trier in Germany (above +33%), all Dutch regions (around +20%), Lazio, Molise and Campania in Italy (above +21%), Comunidad de Madrid in Spain (+18%) and Algarve in Portugal (+18%). On the other hand, around 17% of the regional units face a quite significant decrease of dairy cow herds of more than -4%, as for example most of the Greek regions (-12% to -19%), Lorraine and Alsace in France (-17%), Lisboa and Norte in Portugal (-12%) and South East and Eastern in the UK (-11% to -13%).

The regional effects on agricultural income follow from price and quantity impacts on the input and output side. The bottom line in terms of agricultural income is crucially determined by the impacts on revenues from raw milk and meats and related impacts on non fodder items. While fodder activities are important for a detailed analysis, no significant effect on income can be observed since revenues and costs tend to cancel each other. In general, agricultural income losses are observed all across the EU-27 MS (equating to a loss of -2% on total utilizable agricultural area for the EU-27). The decrease in agricultural income can mainly be attributed to decreases in income from cow milk and meat and to rising non fodder feed costs, with the income losses of the dairy cattle sector (-14% for the EU-27) being the main driver for overall losses in agricultural income.

At MS level the biggest losses in agricultural income are projected for countries in northern Europe, which reflects the situation that in northern Europe the share of milk production in total production tends to be higher than in Mediterranean countries. The largest decreases in agricultural income are projected for Sweden (-5.2%) Finland and Ireland (both -4,5%), Lithuania (-3.8%) and Germany (-3,6%). Nevertheless within MS, mostly those regions that show high quota rents in the baseline see a rather favourable income development (but there are exceptions, as e.g. regions in the Netherlands and Austria also have to cope with small income losses). Agricultural incomes are most heterogeneously affected in Germany, Portugal and Spain. For example in Germany, where overall agricultural income decreases by -3.6%, the most benefitting regions, Saarland and Trier observe income gains of up to 4.8% and 4.4%, while the most negatively affected regions Schwaben, Sachsen-Anhalt, Thueringen and Oberbayern, face agricultural income losses between -6.6% and -5.5%. Hence, in Germany the gains in agricultural income are found in regions with a rather tiny dairy sector, while with Schwaben and Oberbayern, two of the biggest cow milk producing regions in Germany, are among the most negatively affected regions. In Spain, decreases in agricultural income are projected for all regions, with an overall loss in agricultural income of -0,92% on average. However, by far the biggest decreases in agricultural income are projected for the regions in the north west of Spain (Cantabria, Asturias and Galicia face losses between -8.5% and -5.3%), hence in regions where cow milk production plays a major role in agricultural income. Fairly homogeneous income impacts are expected in Finland, Sweden and in particular Hungary, where income losses are in the small range of -0.7 to -1.2%. The percentage changes of overall agricultural income in European regions after quota abolition are visualised in Map 2.

Overall welfare effects are slightly positive for the EU-27. Whereas total agricultural income would decline due to lower milk prices on average, the EU dairy industry would benefit as prices of dairy products are expected to decline less than raw milk prices (i.e. input costs decreasing more

Map 2: Percentage changes of overall agricultural income in European regions after quota abolition



than revenues). Impacts on the FEOGA budget would arise mainly from additional export subsidies for butter and moderate losses of tariff revenues. If a full transmission of lower agricultural raw milk prices along the downward supply chain to consumers is assumed, the main beneficiaries of milk quota abolition would be consumers, who benefit from various declining consumer prices, most notably declining prices for cheese.

The results described in this analysis are based on several implicit and explicit assumptions, hence it is important to take into account these limitations. The current analysis allows for a partially endogenous representation of regional cost structures for dairy producers. Nevertheless, it is important to remark that the cost estimation framework for milk producers applied to this study has been done separately from the simulation analysis with CAPRI, so that no exchange of information between both models has been attempted (due to the short-time frame of the study and its methodological complexity). Although the results of scenario S4 presented are in line with results of other studies, the simulations are based on certain key model parameters. The sensitivity analysis revealed that the higher the assumed elasticity of milk supply, the wider the variety of regional effects. While high supply elasticities tend to make the gap between winning and loosing regions broader, lower supply elasticities produce uniform changes among regions. With regard to quota rents, it has to be stressed that an assumption of different quota rents would have significant effects on the results of milk production as well as on milk prices and agricultural income.

1. Introduction

The dairy sector makes a substantial contribution to the agricultural turn-over in many EU Member States (MS) as well as in the EU in aggregate. Nevertheless, within the EU-27, the size and agricultural importance of the dairy sector varies considerably between MS and across regions, basically reflecting climatic and other agricultural factors in the region concerned. The EU dairy market is regulated by the Common Market Organisation (CMO) for milk and milk products, of which the milk quota regime is one of the most noticeable elements. The EU milk quota system was originally introduced in 1984, in order to limit public expenditure on the sector, to control milk production, and to stabilise milk prices and the agricultural income of milk producers. Since the milk quota regime was introduced, it has become a scarce production factor that limits production on the one hand, but on the other hand stabilises the producer prices of raw milk and keeps milk production in less competitive regions. However, in the course of time EU's dairy policy has been continuously updated and is increasingly targeted at encouraging producers to be more market-oriented. The policy developments, including specific quota increases of various amounts to MS, together with market developments induced that quota is no more binding in some MS and regions of the EU. With the Luxembourg Agreement on the Mid-Term-Review (MTR) the spotlight shifted again on the EU's milk quota regime, because the MTR stipulated that the milk quota system will come to an end in 2015. Within the "Health Check" of the Common Agricultural Policy (CAP) the European Commission endorsed the proposal of milk quota abolition and proposed an increase of quota by 1% annually from 2009 to 2013 to allow a "soft landing" of the milk sector until the end of quotas. In this context it is especially important to clarify, which effects can be expected of an abolition of the milk quota regime.

This report is the last report of a series of three reports delivered to the European Commission's Directorate General Agriculture and Rural Development (DG AGRI) within the project entitled *"Economic Impact of the Abolition of the Milk Quota Regime – Regional Analysis of the Milk Production in the EU" (AGRI-2007-0444)*. The project aimed at a thorough policy impact analysis of the EU dairy markets in 2020, regarding the removal of milk quotas within the framework of the "Health Check" of the CAP. This third report provides a quantitative assessment based on different simulation scenarios performed with the CAPRI Model and allows the comparison of results to previous studies carried out by the AGMEMOD, CAPSIM and EDIM models (Chantreuil *et al.* 2008; Witzke *et al.* 2008; Réquillart *et al.* 2008).

In this study the analysis of milk quota abolition in the EU-27 is addressed at MS and regional level. For this purpose, an appropriate modelling tool able to represent the agricultural sector is needed. Therefore, an adaptation of the CAPRI model is proposed and selected (cf. Britz and Witzke 2008). The CAPRI version used for this study is the standard comparative-static, one without any adjustment costs. Hence the policy simulation would reveal a situation where farmers were given time to adjust their fixed factors according to the new circumstances. As the quota abolition is scheduled for 2015, adjustment to the new policy environment may be considered as fairly complete in the year 2020, for which the simulation results are presented. The comparative static nature of CAPRI also means that any differences between a sudden abolition in 2015 and a soft landing strategy, as envisaged in the

Commission's "Health Check" proposals, would have no impacts on the CAPRI simulation result for 2020.[2]

After this introductory chapter, chapter 2 gives an overview on the production structure, performance and the dairy policy developments of the EU dairy sector. Chapter 3 describes the major specifications of dairy policies in CAPRI and the definition of scenarios. Chapter 4 is devoted to the analysis of the baseline and quota removal scenarios with special focus on changes on MS and regional level. Chapter 5 draws conclusions and highlights some limitations of the study. Additional information related to regional quota rents, validation of results, results from previous studies and selected technical issues are presented in the annexes.

2 Questions related to an optimal rate of quota increase over the phasing out period cannot be analysed in this study.

2. Overview on the production structure, performance and policies of the EU dairy sector

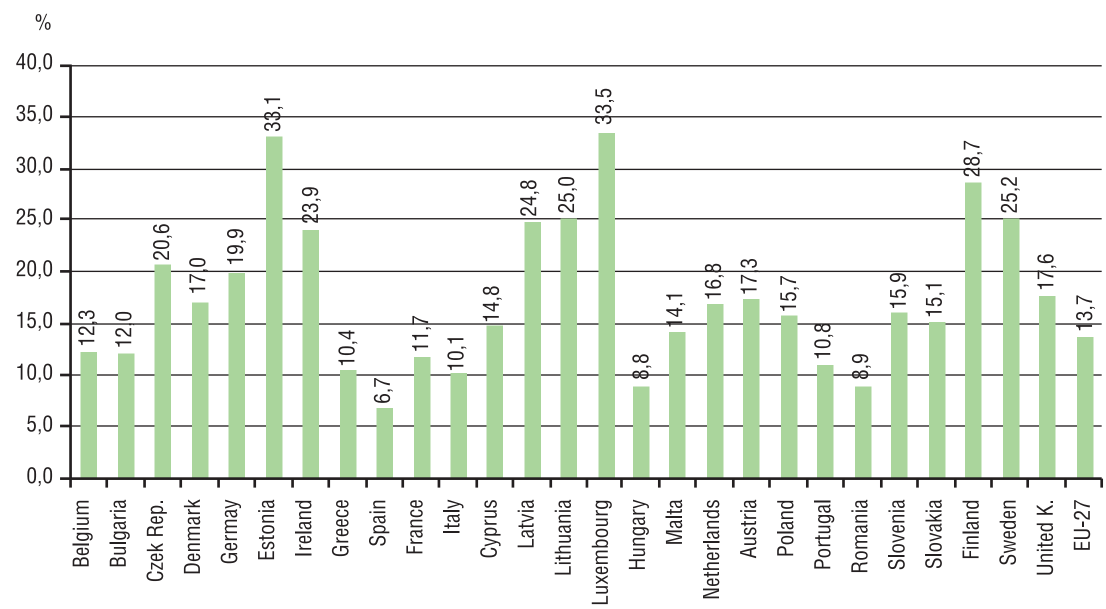
The EU dairy sector is important to the EU in many respects. Most notably, milk is the number one single product sector in terms of value of agricultural output, and milk is produced in every single EU MS without exception. However, within the EU-27, the size and agricultural importance of the dairy sector varies considerably between MS and across regions. A brief overview on the production structure and performance of EU dairy farming is given in section 2.1. Developments in the EU dairy sector have to been seen in the context of the development of EU dairy policies, thus domestic and trade support measures of the EU are delineated in section 2.2, with a special focus on the EU milk quota system.[3]

3 This chapter draws substantially on Bartova *et al.*, 2009

2.1 Production structure and performance of EU dairy farming

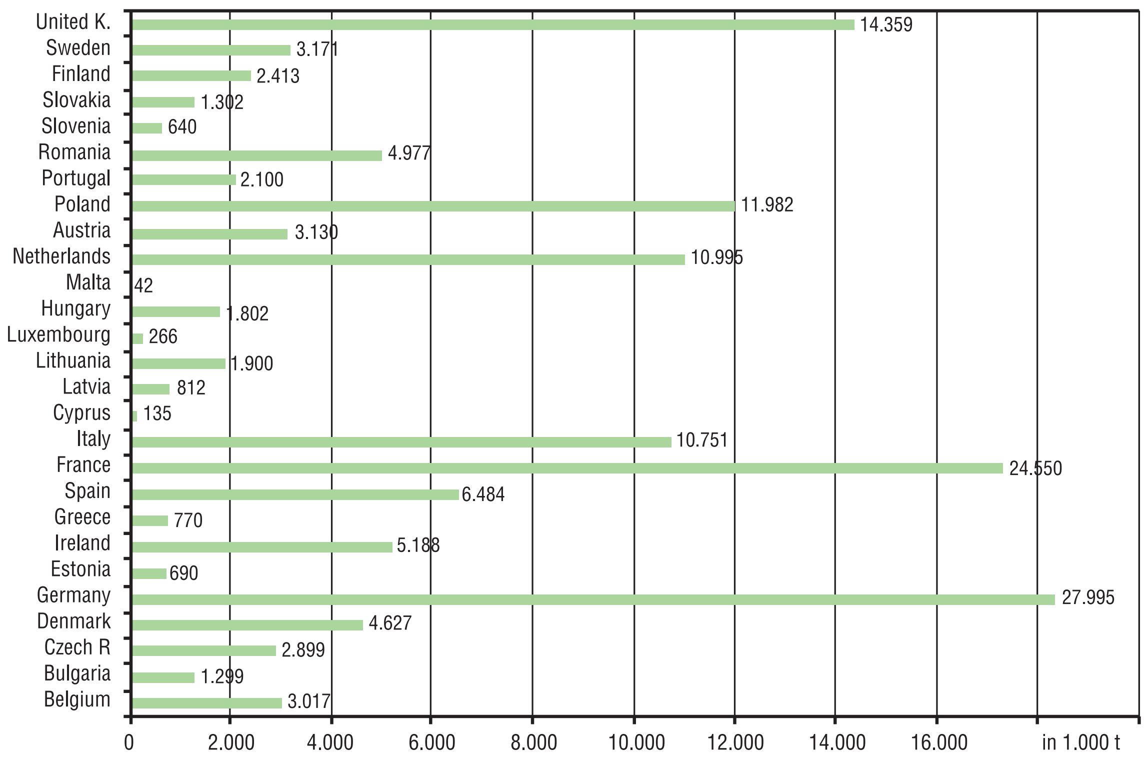
Milk is one of the main agricultural commodities produced in the EU. Milk production takes place in all EU MS and at EU level it represented a share of about 13,7% of total agricultural production in 2006, amounting to a value of more than EUR 42,5 billion at the farm gate level (European Commission, 2008b). Within the EU-27, the size and agricultural importance of the dairy sector varies considerably between MS and across regions, basically reflecting climatic and other agricultural factors in the region concerned. In terms of value, the share of milk in total agricultural production ranges from 6.7% to 33.5% between MS. In general, the share tends to be higher in northern Europe and lower in Mediterranean countries (cf. Figure 1).

Figure 1: Share of milk production in total production per MS (by value) in 2006



Source: European Commission (2008b)

Figure 2: Cow milk production, year 2006 (in 1.000 tonnes)



Source: European Commission (2008b)

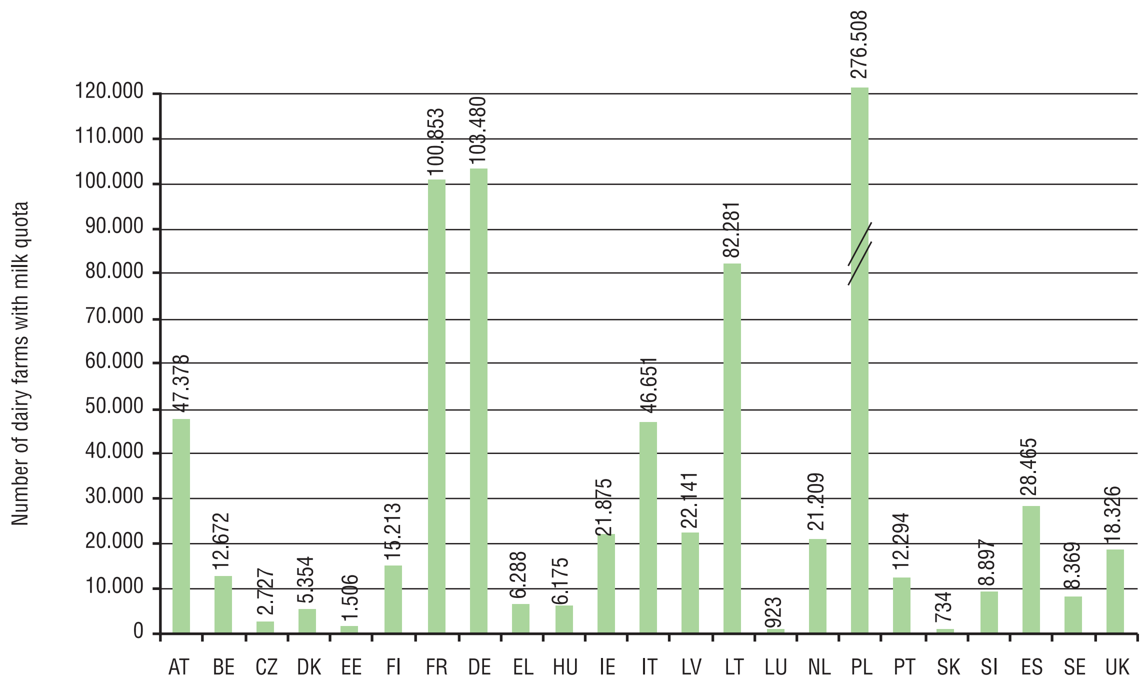
Within the EU, six MS - Germany, France, the United Kingdom, Poland, the Netherlands and Italy - together account for almost 70% of the cows' milk production in the EU. Germany has the highest level of milk production at about 28 million tonnes followed by France and the United Kingdom with a production of 24,5 million tonnes and 14.3 million tonnes in 2006, respectively (European Commission, 2008b). Among the NMS, Poland has the highest level of milk production, with almost 12 million tonnes being the fourth biggest producer in the EU-27 (Figure 2).

The production of cow milk also varies significantly at regional level within the MS. In the six leading cow milk production MS, the NUTS 2 regions with the highest cow milk production are in France: Bretagne (4961,4), Pays de la Loire (3554,6), Basse-Normandie (2661,0) and Rhône-Alpes (1606,9); in Germany: Weser-Ems (2626,8), Schleswig-Holstein (2424,6), Oberbayern (2211,2) and Schwaben (1916,9); in Italy: Lombardei (4040,6), Emilia-Romagna (1780,7) and Veneto (1033,5); in Poland: Mazowieckie (2105,0), Podlaskie (1667,0) and Lódzkie (1043,0); in the Netherlands: Friesland (1961,0), Overijssel (1757,0), Gelderland (1698,0) and Noord-Brabant (1581,0) and in the UK: West Wales and The Valleys (1335,0), Dorset and Somerset (1141,0), Shropshire and Staffordshire (1050,0), South Western Scotland (961,0) and Devon (940,0). Furthermore it is worthwhile mentioning Southern and Eastern (4078,8) in Ireland and Galicia (2293,4) in Spain as NUTS 2 regions with a remarkable high level of cow milk production.[4]

Figure 3 shows that the number of EU dairy farmers holding a milk quota in Poland are more than twice than in Germany or France. Especially

4 All data in 1.000 tonnes, data refers to year 2004; source: EUROSTAT (2008)

Figure 3: Number of EU dairy farmers with milk quota, year 2007



Source: European Commission (2008a)

when taking the production of cow milk into account (Figure 2), the high numbers of dairy farmers in Lithuania, Italy and Austria are also remarkable, as is the relatively small number of dairy farmers in the UK. Accordingly, the numbers shown in Figure 2 and Figure 3 indicate differences among MS with regard to dairy cow productivity, cow herd size and/ or general structure of the farm holding.

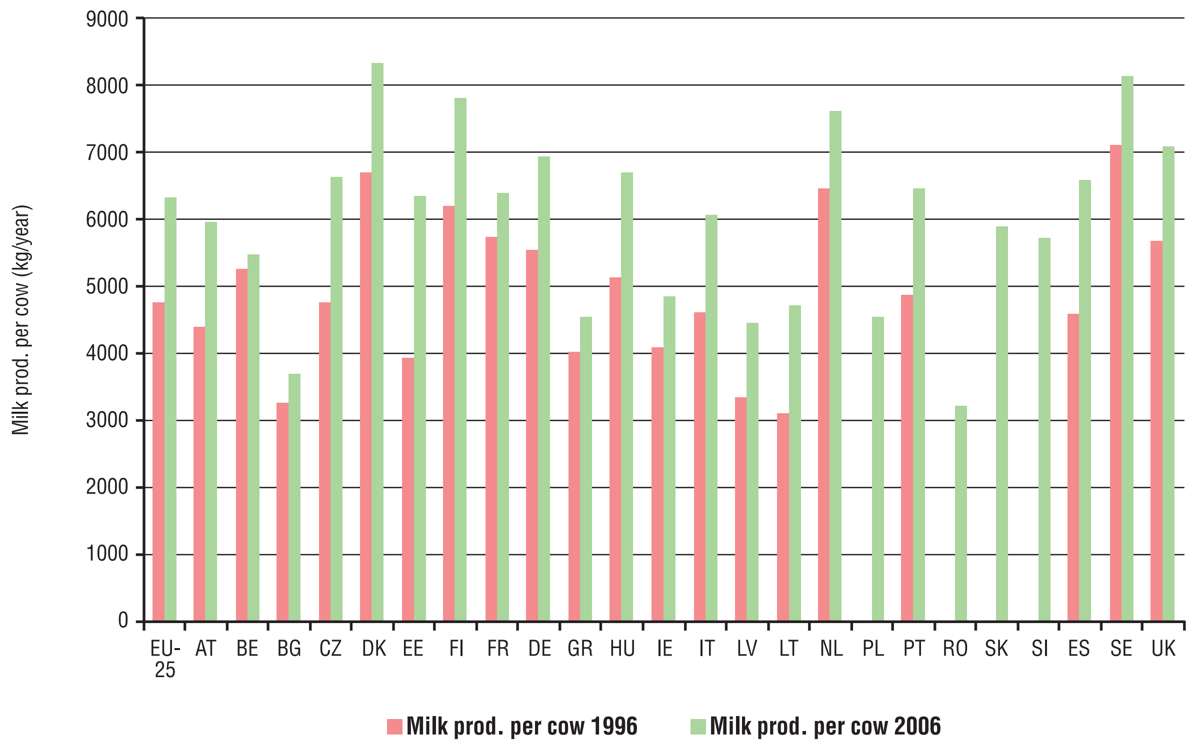
In addition to variations between MS in the scale of production and the number of dairy farmers with milk quota, there is also a significant variation in the milk yield per cow. EU milk producers with the highest average milk yields are to be found in Denmark, Sweden, and Finland, with Denmark reaching in 2006 an average of 8337 kg per cow and year. Milk yields increased throughout the EU from 1996 to 2006, with the biggest yield growth occurring in Estonia. Other MS with above-average milk yield growth rates are Lithuania, Spain and the Czech Republic (cf. Figure 4).

Due to the milk quota system, productivity gains in milk yields lead to continuing reduction in the total number of dairy cows in the EU. The biggest relative reduction of the dairy cow herd for the period 1996 to 2006 occurred in Estonia (36.5%), while the most pronounced reduction in total numbers was observed in Germany. The change in the number of dairy cow herds over the period 1996 to 2006 across the EU MS is summarised in Figure 5.

Besides the differences in the number of dairy cows between the MS, the number of dairy cows also varies significantly at regional level within the MS. The biggest population of dairy cows can be found in the Bretagne (France) followed by Lombardia (Italy) and Mazowieckie (Poland). The EU regions with the highest number of dairy cows are listed in Table 1.

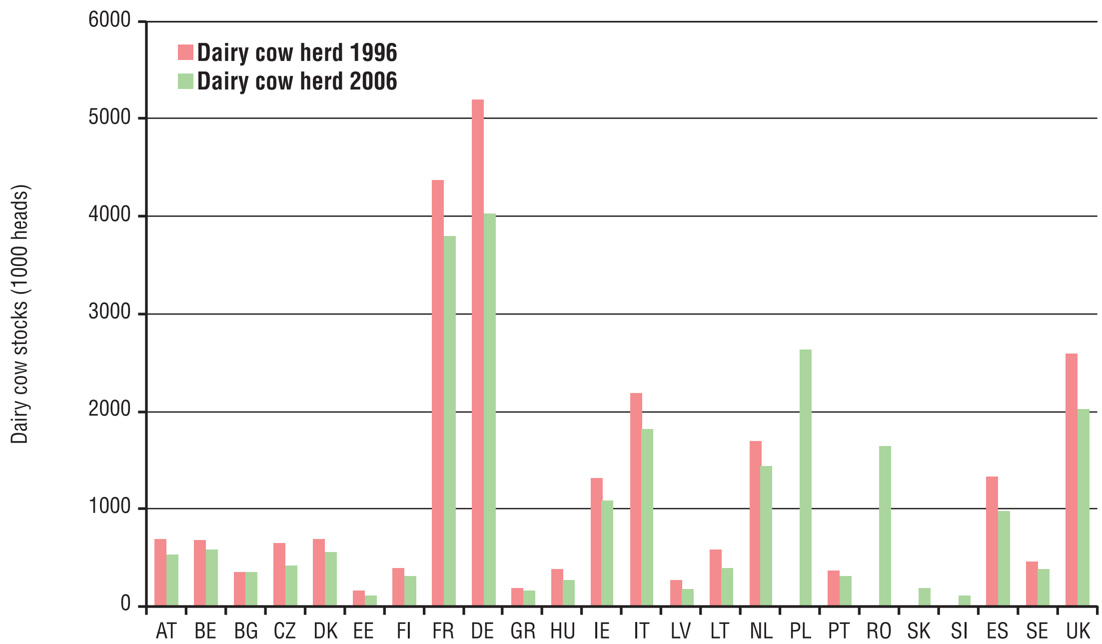
A further indication of the diversity of EU dairy farming is given in Table 2 by the number of dairy cows in different herd size categories in

Figure 4: Annual EU dairy cow productivity



Source: European Commission (2008b)

Figure 5: Change in the number of dairy cows in EU MS from 1996 - 2006



Source: European Commission (2008b)

Table 1: EU regions with the highest number of dairy cows

NUTS 2 Region	MS	Number of dairy cows*	NUTS 2 Region	MS	Number of dairy cows*
Bretagne	France	761,3	Weser-Ems	Germany	376,3
Lombardia	Italy	601,5	Schleswig-Holstein	Germany	357,7
Mazowieckie	Poland	539,2	Schwaben	Germany	318,0
Pays de la Loire	France	527,6	Wielkopolskie	Poland	301,3
Basse-Normandie	France	473,0	Northern Ireland	UK	292,0
Galicia	Spain	450,4	Rhône-Alpes	France	291,9
Oberbayern	Germany	393,5	Emilia-Romagna	Italy	287,1
Podlaskie	Poland	382,3	Friesland	Netherlands	273,6

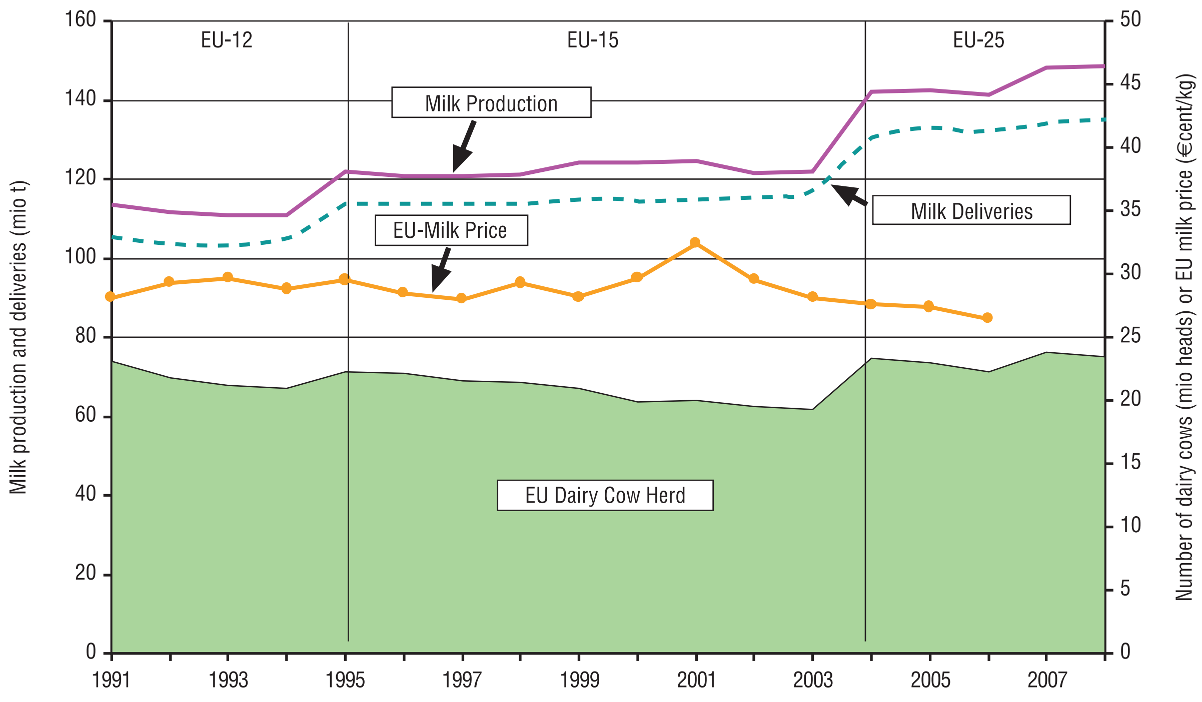
** in 1.000 heads, data refers to year 2003; Source: EUROSTAT (2008)*

Table 2: Number of dairy cows in each herd size category in EU MS in 2005

	Number of cows in 1000 heads by herd size category					Dairy cows total
	1 - 9	10 - 19	20 - 49	50 - 99	> 100	
Belgium	7.23	31.23	251.82	220.77	38.29	549.34
Czech Republic	9.31	8.04	14.71	22.90	385.55	440.51
Denmark	1.94	4.71	44.01	137.76	369.44	557.86
Germany	86.67	356.72	1441.24	1267.06	1084.27	4235.96
Estonia	15.09	5.68	9.73	7.06	77.67	115.23
Greece	19.05	19.12	49.31	49.95	30.49	167.92
Spain	55.70	114.81	377.76	232.58	221.29	1002.14
France	30.53	148.81	2069.89	1461.79	172.82	3883.84
Ireland	6.55	35.18	372.22	523.40	144.62	1081.97
Italy	102.43	150.01	428.93	452.68	726.14	1860.19
Cyprus	0.02	0.00	0.59	7.94	15.66	24.21
Latvia	93.08	18.65	20.10	11.90	28.63	172.36
Lithuania	367.96	41.54	28.68	11.86	43.84	493.88
Luxembourg	0.10	0.93	22.58	12.95	2.79	39.35
Hungary	20.18	6.70	8.88	11.53	189.09	236.38
Malta	0.08	0.28	2.20	2.84	1.88	7.28
Netherlands	3.92	16.59	261.07	797.09	354.53	1433.20
Austria	143.89	215.74	158.30	15.46	2.40	535.79
Poland	1428.26	665.35	516.74	81.73	160.90	2852.98
Portugal	24.08	34.23	98.33	71.53	59.11	287.28
Slovakia	15.40	0.57	1.88	7.43	167.92	193.20
Slovenia	50.96	36.58	32.83	6.51	3.81	130.69
Finland	19.76	102.70	164.81	26.73	4.76	318.76
Sweden	2.22	19.45	143.70	131.17	96.70	393.24
United Kingdom	10.66	17.41	231.00	608.38	1197.64	2065.09
EU-15	514.73	1267.64	6114.97	6009.30	4505.29	18411.93
EU-25	2515.07	2051.03	6751.31	6181.00	5580.24	23078.65

Source: ZMP (2007)

Figure 6: EU milk production, deliveries and dairy cow herd, 1991 – 2007



Source: European Commission (2007b)

the year 2005. In Germany, the EU MS with the highest level of milk production, 64% of the dairy cows are held in herds of 20-99 cows, and 26% in herds with more than 100 cows. In France over 90% of the dairy cows are in herds of 20-99 cows, with only 4.5% of the dairy cows in herds bigger than 100 cows. In contrast to France, in the UK 57% of the dairy cows are held in herds with more than 100 cows, whereas in Denmark 66% and in the Czech Republic more than 87% belong to this category. On the other hand, in Austria less than 0.5% of the cows are held in herds larger than 100 cows and Poland, the fourth biggest milk producer in the EU, has 50% of dairy cows in herds smaller than 10 cows.

As milk production in all MS is regulated by quotas, milk supply in the EU is quite stable and quotas have been binding in most years until 2004. From 2005, some MS deliveries have increasingly fallen short of the quota, following the increase in quota (in 11 MS of the EU-15, due to the enlargement and granting of restructuring reserves for the EU-10) reductions in the intervention prices for butter and SMP, as well as unfavourable exchange rates movements. However, such shortfalls could also be due to unfavourable weather conditions. Nonetheless, when it comes to countries such as the UK, where deliveries have been below quota for several years in succession, there may be evidence to confirm structural reasons for under-delivery of the quota. Historically, granting additional quotas to particular MS has led to milk production growth. When milk prices are relatively high in the previous season and forage feed is abundant, minor over-deliveries may take place in a given year. Figure 6 shows the evolution of EU milk production, deliveries and dairy cow numbers as well as EU milk prices in the period since 1991.

When production costs are considered, low cost producing countries are to be found in the north-western and eastern regions of the EU, namely Ireland, the UK and Poland (Isermeyer *et al.*, 2006). But variations in production costs are more extensive, as the production costs also vary within MS, e.g. due to differences in the production mix, factor endowment, specific geographical location (e.g. mountainous area), variations in the size of the herd, specialisation and management skills. Although the UK is one of the EU's low cost producers, its quota has not been binding for several successive years. However, in this context, it should be kept in mind that milk prices in the UK have been lower in recent years compared to other MS in the EU-15, mainly due to the market power of the retail sector, which has squeezed producer margins, particularly for drinking milk, which represents a large proportion of UK milk utilisation (cf. Colman, 2002). Despite the fact that in principle the CAP has created a single price threshold across all MS in the form of the intervention system, the range of producer milk prices across the EU have varied considerably, e.g. in 2006 the producer milk price for standardised milk ranged from 176.7 €/tonne in Lithuania to 390 €/tonne in Cyprus (ZMP, 2007). Such variations are associated with differences in the pace of price convergence after integration into the single market, but are also due to MS level differences in supply and demand, the level of market integration, specificities along the supply-chain and the types of milk products produced. In general, the EU-15 has experienced reductions in the producer milk prices, while the EU-12 has seen increases in production and processing costs. These changes have had impacts on the actual level of milk production. In sum, the production potential differs across the EU, and while some countries are unable to fill the milk quotas, the quota remains binding for other countries (e.g. Austria, Luxembourg, Ireland, Cyprus, Netherlands, Denmark, Germany, Italy, and Poland).

2.2 Development of dairy policies in Europe

Developments in the dairy sector have to be seen in the context of the evolving nature of dairy policy and trade policy. Although Agenda 2000 and more particularly the MTR have brought about a considerable change in support to the dairy sector, existing CAP instruments such as milk quotas, super levies, intervention prices, dairy premiums, processing aids, export subsidies and import tariffs still affect the supply and demand for milk and milk products. In order to give an overview on the development of the EU dairy policy, the domestic support measures with special focus on the EU milk quota system and trade measures are outlined in this section.

The milk quota system

EU milk production increased steadily in the 1970s and 1980s due to the price support policy within the Common Market Organisation (CMO) for Milk and Milk Products. By the late 1970s milk production outstripped overall milk consumption and lead to rapidly rising expenditures for the stocking of butter and SMP. In order to limit public expenditure on the sector, to control milk production, and to stabilise milk prices and the agricultural income of milk producers, EU MS agreed to impose milk quotas by the milk marketing year 1984/85. The quota was made effective by the imposition of a fine (superlevy) for milk output exceeding a guaranteed quantity (reference quantity or quota).

Originally scheduled for just five years, steps were then taken to extend the milk quota system until 1992. The Reform of the CAP in 1992 (MacSharry Reform) led to a further prolongation of the quota system until 2000, at which point, as part of Agenda 2000, the system was further extended until 2008. Finally with the Luxembourg Agreement on the MTR in 2003, MS approved another extension of the quota regime until 2015. The extension under the MTR is notable since, in contrast to previous situations, MS must actively advocate a prolongation of the quota regime beyond 2015, otherwise it will lapse and milk quotas will cease to present a restriction on production.

The milk quota year starts on 1 April and ends on 31 March the following year. If national quantities are exceeded, a levy will be charged to milk producers for the excess of deliveries. Originally fixed as a percentage of the target price, super levy rates are now specified for each respective quota year. Processors collect the levy from individual producers who have over-delivered, but only, if the national reference quantity is exceeded. Under-deliveries by producers not meeting their individual quota may be subtracted proportionally. Currently the fat content is fixed for individual reference quantities at the 2003-2004 quota year. If the individual's actual milk fat content exceeds its fat reference level, the amount of milk delivered will be multiplied by 0.18% per 0.1g milk fat/kg in excess of the reference fat level or reduced if the fat is less than the reference level (the so called butterfat adjusted volume)[5].

Since the milk quota regime was introduced, it has become a scarce production factor limiting, on the one hand, production and the scope for EU exports, but on the other hand stabilising producer prices of raw milk. The quota regime allows milk prices to rise above the equilibrium price level of an unregulated market, where prices would otherwise equate with the marginal cost of production. In this way, quota rents are generated (i.e. the quota rent is the difference between the farm milk price and the marginal cost of production). As long as quota rents are positive, the quota quantities will be filled, and the quota regime is binding. Other things being equal, technical progress in dairy production would lower production costs and lead to an increase in the quota rents over time. On the other hand, declining levels of support or increases in the milk quota may reduce market milk prices, while an increase of production input prices, such as feed grains, may increase costs, thus quota rents may decrease over time. When declining market prices or rising production costs reach the equilibrium price, the quota rents will turn to zero and the quota itself will no longer be binding (cf. Box 1).

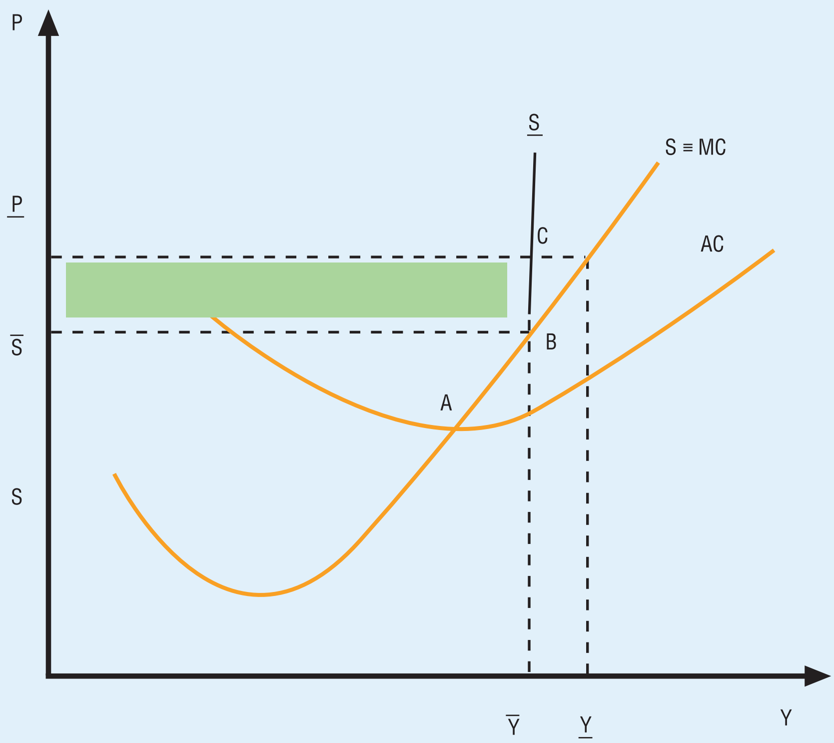
A producer's individual quotas can be transferred to another producer through either the transfer of an entire farm, the leasing or purchase of quota, or the allocation of quota from a national reserve. The transfer of milk quota may take place via a variety of administrative and market-based mechanisms including private sales and quota exchanges. MS are able to determine whether transfers take place at national, regional or purchaser level and whether transfers are continuous or periodic. Thus country-specific transfer rules have been set-up by each MS and vary considerably across countries. The tradability of quotas can enhance competitive milk production (if quota is freely tradable) or freeze milk production in non-competitive areas (if quota trade is regionally restricted). Quota trade might be restricted in order to maintain producers in less competitive regions in activity. Regionally restricted quota tradability can lead to a situation where within one country there are regions where farmers face binding quotas and other regions where quotas are non-binding. If quotas are tradable, efficient farmers can buy quota from less efficient farmers, which reduces potential inefficiencies generated by the quota system. Accordingly inefficiency plays a greater role if quota distribution and reallocation is restricted. Thus when a quota system is removed, it can be expected that in a system with restricted quota tradability the sectoral adjustments will be more pronounced, because a new market equilibrium will not be determined by the originally supply curve, but rather by one that takes increased efficiency impacts into account (cf. Box 2).

As part of the Agenda 2000, specific quota increases of various amounts were awarded to five MS in 2000 and 2001, while additional quotas of 1.5% were distributed in three tranches starting in 2006/07 to those EU-15 MS having received no additional special reference quantities in 2000 and 2001 (with the UK receiving both an increase

5 Note that this rate has been reduced to 0.09% in the context of the "Health Check".

Box 1: The concept of milk quota and milk quota rent

In the figure below, milk quota and milk quota rent are represented at the producer level. The supply curve S coincides with the increasing part of the marginal cost (MC) curve which is above the intersection with the average cost (AC) curve, i.e. the section above A on the MC curve. The average cost curve is assumed to be U-shaped and the MC curve crosses the AC curve at the minimum.



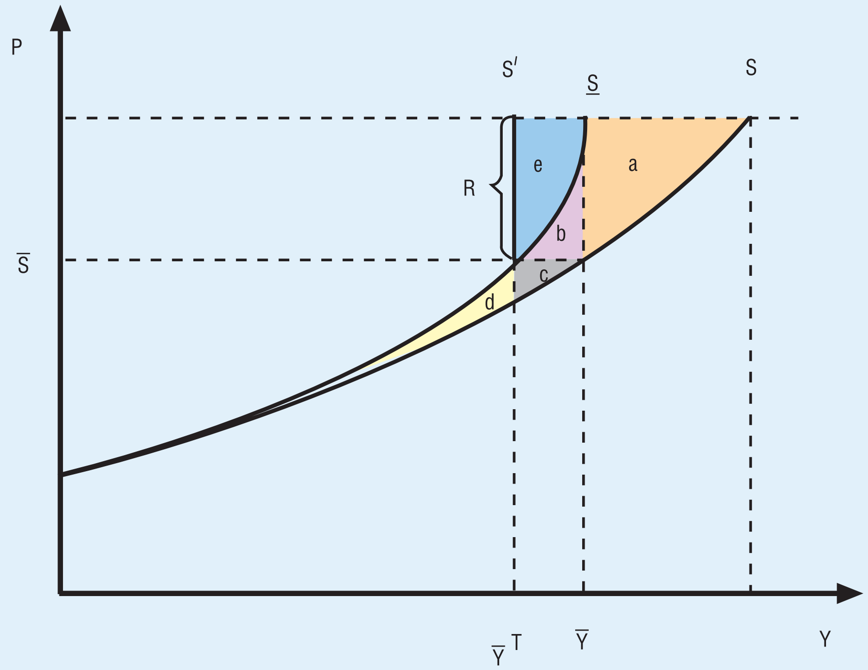
The introduction of a quota creates a departure from standard competitive market pricing, where profit-maximising agents equate marginal revenue to marginal cost. If a quota is binding, production will be limited compared to the unrestricted market equilibrium. The new level of production will be fixed at $\bar{y}$ which represents the binding quota level on the left hand side of the initial production equilibrium level $\underline{y}$. The supply will be kinked at point B and becomes perfectly inelastic at the quota level (i.e. vertical on the segment B$\underline{S}$). The new supply curve will be constituted by the segment AB$\underline{S}$, so that it is no longer possible to directly observe production responses to price changes if quotas are binding. At $\bar{y}$ marginal revenue is greater than marginal cost and marginal cost coincides with the so-called output shadow price. The milk shadow price is the producer price that would induce a profit-maximising producer to produce the current quota level in the absence of production restrictions. The difference between the market price and the shadow price defines the so-called unit quota rent, which corresponds to $\bar{p} - \bar{s}$. The total quota rent will be composed by the area ($\overline{ps}$BC) highlighted by light yellow colour.

In terms of implementation, milk quotas are imposed through the payment of a fine (the superlevy). When the superlevy is applied at producer level, it means that for excess production the producer receives the market price less the fine. Usually the fine is that large that net return for a kilogram of surplus milk will by far not cover costs. However, if the farmer has a quota rent that is larger than the superlevy it would be rational to produce in excess of his quota.

In addition to the standard milk quota and milk quota rent description presented in the figure above, there are at least four additional cases where farmers do not respond according to the magnitude of the quota rent, but rather according to the difference generated by the difference between milk market price and the average cost at quota level (for more details see Tonini and Pérez Dominguez, 2008).

Box 2: Implications of quota value and the trading of milk quotas

Following the standard theory of the effect of milk quota on asset values (see e.g. Burrell, 1989), a comparative static example of tradable milk quotas is presented in the figure below.



Beginning from a situation where quotas are not in place, the quantity produced will be y, generating the farm revenue $\bar{p}y$. Farm revenue is allocated among the variable resources (i.e. the area below supply curve S) and fixed resources (i.e. area above supply curve S). Now consider, that a quota system is introduced, i.e. a limit on milk production is denoted by $\bar{y}$. In a quota regime, the reference quantities are attributed based on historical production levels, assuming that all producers face the same cost structure. Thus, if farmers are exposed to the same percentage cut on production, it is likely that some efficient production will be lost and some inefficient production will be maintained. This renders the initial supply S to shift to S. The upward supply shift causes a decrease in the producer surplus by area $(a + b + c + d)$. However, the total loss in producer surplus can be decomposed into two losses. First, due to the quota's introduction, area (a) is lost. Second, because of the inefficient attribution of reference quantities (i.e. grasped on a historical basis) supply becomes steeper than the original supply, which causes the loss of area $(b + c + d)$.

When the quota system allows quota rights to be traded (i.e. leased out or sold), less efficient producers are expected to transfer quota rights to more efficient producers, thereby achieving more efficient resource allocation than in the case where quota cannot be traded. The price under which quota rights are exchanged is the annual rental value of the quota, given by the difference between market price $\bar{p}$ and marginal cost $\bar{s}$ (i.e. R in the figure). At this price, the quantity $\left(\bar{y}^T - \bar{y}\right)$ would be exchanged. Revenue equals area $(e + b)$ is generated for producers who lease out or sell the quantity $\left(\bar{y}^T - \bar{y}\right)$ where area (e) acts as a compensation for the loss of income to fixed resources. At the same time, those producers who lease in or buy gain the area $(e + b + c + d)$ at the cost of $(e + b)$ (i.e. $(d + c)$ is the net benefit). In a free quota trade market, supply would be restored at the equilibrium under quotas (see the kinked supply S in the figure) that eliminate initial distributional inefficiencies due to the different cost structures. The net benefits for the sellers in terms of area (b) and for the buyer in terms of area $(d + c)$ will depend on the sector's inefficiency distribution. Hence, quota mobility has twofold effects. First, there is an explicit incentive for sellers to eliminate their quota, gaining area (b) pushing for structural changes within the sector. Second, quota trade potentially push quota rights away from less efficient to more efficient producers (for more details see Tonini and Pérez Dominguez, 2008).

in 2000 specifically for Northern Ireland and the 1.5% increase). Furthermore the structural reserves agreed under the accession negotiations for the EU-12 (excluding Malta) have been allocated in 2006/07.

Separately, and in advance of the HC, a 2% milk quota increase was approved on 17 March 2008 by the European Council for 2008/09. The additional 2.84 million tonnes of quota, which this represents, is considered to be required to meet growing domestic and global demand and to curb the then rising dairy prices within the EU. The increase is distributed across the EU on an equal basis.

Public intervention

The major domestic support measure besides the milk quota system is public intervention (buying into storage) for butter and SMP. By administering the market price for butter and SMP through intervention purchases, the EU aims to put a floor on the producer milk price. If market demand is satisfied, minor surpluses or deficits will, in principle, show up through changes in the level of intervention stocks, but the market prices will not fall much below the respective intervention levels.

In principle, the EU Agricultural Council may change the reference intervention prices in the light of developments in production and the markets. Governmental purchases may be replaced by aids for private storage. As administrational cuts to intervention prices were difficult to achieve in the past and, as intervention prices above the respective equilibrium induced production growth and stock building, a tendering system for butter was implemented in 1987 and SMP intervention purchases were limited to 109000 tonnes. Since March 2004 a further change has meant that butter can only be purchased for intervention when prices are below 92% of the intervention price, but actually, butter is only accepted at 90%. Butter intervention purchasing has become seasonal and only available from 1 March to 31 August, though it was suspended when the amount exceeded 40000 tonnes in 2007, and will be suspended at 30000 tonnes from 2008 onwards, being replaced by a tendering system without a minimum price if this threshold is reached.

Supplementing aids can be paid for liquid skimmed milk used in the manufacture of casein and in feeding. They can also be approved for SMP employed in feedstuff, making it more competitive compared to vegetable proteins. The subsidy rate granted takes into account market conditions, e.g. it was reduced to zero in October 2006, as EU market prices for milk protein became exceptionally high. In general, comparable aids are provided for the use of cream, butter and concentrated butter.

Based on tenders, a maximum rate of aid or a minimum selling price is set. Due to high international prices throughout summer 2007 and spring 2008, market aids had been fixed at zero, with the exception of butter sales to non-profit making organisations and school milk.

The dairy premium

To reflect changing dairy market conditions and the general political environment, the dairy CMO has been continually altered. Policy reforms such as Agenda 2000 and the MTR have brought about a considerable decline in the market price support for the dairy sector. By way of partly compensating for cuts in intervention prices, direct payments (the so-called dairy premium) were introduced in 2005, which were subsequently incorporated into the Single Payment Scheme (SPS).

The dairy premium introduced as an additional compensation, amounting to 24.49 €/tonnes from 2006, can be supplemented by an increasing national top-up to a maximum of 11.01 €/tonne. In the EU-15, the dairy premium had to be integrated in the SPS by 2007 at the latest. The EU-12 may only gradually introduce the direct payments starting with 25% of the full payment level in the first year of introduction and ending with 100% in 2013. However, they are allowed to provide national top-ups of a maximum 30%, which will have to be successively reduced to zero. Regarding the implementation, most of the MS of the EU-12 opted to use the SAPS reflecting flat area payments. But this regime will have to be replaced by a regionalised SPS, at the latest, by the end of 2013.

Further simplifications of the CMO

Some further simplifications concerning the general market organisation have been introduced in 2007 in the so called 'mini milk package', dealing with the standardisation of the protein content in preserved milk (together with a reduction of the intervention price for SMP), simplifications to the Council Regulation (EC) 1255/1999 (e.g. elimination of aids for private storage, removal of the butter intervention trigger mechanism) and liberalisation of the drinking milk market by allowing marketing of milk with fat contents outside the current three categories.

Trade measures

Historically dairy prices within the EU were higher than those internationally and usually more stable than those on the world market. Surplus EU dairy production generally was exported in considerable volumes to lower price third country markets with the aid of export subsidies.

Dairy products are generally consumed in the market in which they are produced and the extent of international trade in dairy products is limited, representing just 7% of global dairy production in milk equivalent terms. Up to the year 2003, EU dairy production and exports had a major influence on the world price in the relatively small world market for dairy commodities. Since then, rapidly growing international demand and a slowdown in production growth in other key export countries, have somewhat altered this picture. In particular since 2005, slower growth in exports and rising demand for imports on world markets have led to an undersupply of dairy products on international markets and hence to rising international dairy commodity prices.

One of the consequences of the shortage of dairy products on international markets throughout 2007 has been that the negative effects on milk price of the MTR support price reductions have been more than counterbalanced, and so EU producer milk prices have increased, rather than decreased, since 2007 until spring 2008. Much of the EU's dairy support measures, like processing aids and export refunds, have been suspended completely in 2007.

When considering trade measures, one has to keep in mind that the EU forms a Single Market, hence, all border measures are removed between the MS. However import tariffs are imposed on third country imports and are bound by the WTO Uruguay Agreement. In the dairy sector, specific tariffs or combinations of ad valorem and specific tariffs are applied in most cases, although many trading partners of the EU benefit from special import arrangements, whereby imports can come in at lower tariffs. These import arrangements are known as Tariff Rate Quotas (TRQ) and while some TRQs are specific to particular exporting countries, others are open to all countries under the Most-Favoured Nations (MFN) treatment of the WTO. There are some regional exceptions to the operation of the MFN tariffs, such as for example the Everything but Arms (EBA) initiative for Least Developed Countries (LDC) within the framework of Generalised System of Preferences (GSP). Here, tariffs for most imports into the EU are zero. Exceptions were also created for African, Caribbean and Pacific (ACP) countries.

3. Specification of dairy policies in CAPRI and scenario definition

In order to better represent the dairy policies, the CAPRI model required an update which comprises additional information on milk quota rents, and the introduction of explicit price supply elasticities for dairy products. The major specifications of dairy policies in CAPRI are briefly described in subsection 3.1 and subsection 3.2 presents the main characteristics of the scenarios to be analysed in this study.

3.1 Specification of dairy policies in CAPRI

The CAPRI model is an agricultural sector model covering the whole of the EU-27, Norway and Western Balkans at regional level (around 250 regions) and global agricultural markets at country or country block level. CAPRI makes use of non linear mathematical programming tools to maximise regional agricultural income with explicit consideration of the CAP instruments of support in an open economy. CAPRI consists of a supply and market module which interacts iteratively. The supply module follows a 'template approach', where optimisation models can be seen as representative farms maximising their profit by choosing the optimal composition of outputs and inputs at given prices. Major outputs of the supply module are crop acreages and animal numbers at regional level, with their associated revenues, costs and income. The market module consists of a constrained equation system with a spatial world trade model. Major outputs of the market module include bilateral trade flows, market balances and producer and consumer prices for the products and world country aggregates.

For a better representation of the dairy sector, the CAPRI model was updated by incorporating an econometric supply module for the most representative dairy farms in the EU. The update comprises additional information on milk quota rents, and the introduction of explicit price supply elasticities for dairy products. While a detailed description of dairy policy specifications in CAPRI is given in Tonini and Pérez Domínguez, 2008, and a general documentation on the CAPRI model in Britz and Witzke, 2008, this section briefly describes the major specifications of dairy policies.

3.1.1 Implementation of milk quota and milk quota rents

The supply model of CAPRI describes agricultural production at the regional farm level. In the calibration phase of CAPRI the number of dairy cows are determined by calibration restrictions. To avoid interference between milk quota constraints and calibration constraints, milk quota are treated like a variable input purchased from outside the agricultural sector (e.g. electricity). The cost of milk quota are included in the regional objective function, with the price of milk quota equal to the regional or national milk quota price and quantity equal to regional milk production. After the calibration phase the cost of milk quota is removed from the regional objective function. Next, regional milk quotas are explicitly included as a regional constraint on milk production. This procedure ensures that the shadow price of the milk quota constraint equals the price of milk quota in the calibration phase.

Although some MS allow almost free trade of milk quota at nation level and others at regional level, CAPRI does not allow for trade of milk quotas between regions. This simplified approach can be justified by existing transaction costs and differences in preferences between dairy farms. This also explains the existence of differences in milk production marginal costs at farm level, even in the case of free milk quota trade.

Quota rent is defined as the difference between the farm milk price and the marginal cost of production. It is therefore an income generating asset for the person who holds the quota. Quota rent identifies the amount of surplus generated by a restriction on supply, with levels dependent upon the current milk price at farm gate level and long-term marginal costs (cf. section 2.2). A technical problem of modelling milk quota rents is that actual milk production is not fully in line with the quota endowments, meaning that some Member States overshoot their respective quotas while others produce below quota level. Hence the question is to decide what change should be assumed for the baseline, given that there is some additional quota expansion. Furthermore, there is the question on whether countries with over- or under-delivery in the base year would move to the quota level or maintain their over-/under-delivery throughout the baseline. A return to quota is certainly appropriate for those countries with fluctuating over- or under delivery, such as the Netherlands.

In order to simulate milk production in the baseline scenario, two main assumptions have been taken for each Member State: (a) *"return to quota"*, which indicates that quota is assumed to be met in the baseline period, and (b) *"stable deviation"*, which implies that quota will be over- or under-delivered in the baseline. Except for Greece these assumptions are in line with the EDIM model (see Réquillart *et al.* 2008). In the case of Greece, it appears that quota is increasingly being filled following milk quota expansion after 2003 such that the "return to quota" category would apply here as well. Information on the assumption taken for each MS with regard to quota over- or under-delivery can be found in the column "modelling" of Table 3.

In the future baseline scenarios, the quotas for deliveries are set as follows.

$$QUTS(c,del,t,m) = PRCM(bas,m) * QUTS(o,del,t,m) / QUTS(o,del,bas,m) * Fac(t,m) \quad (1)$$

where

QUTS(c,del,t,m) = Quota on deliveries in CAPRI in year t, Member State m

PRCM(c,bas,m) = Base year deliveries (processing) in CAPRI in Member State m

QUTS(o,del,t,m) = Official quota on deliveries in year t, Member State m

QUTS(o,del,bas,m) = Official quota on deliveries in base year, Member State m

Fac(t,m) = Adjustment factor for year t, Member State m

For MS in the group "stable deviation" Fac(t,m) = 1, which is the approach applied to all MS in past CAPRI applications. For MS in group "return to quota" we would set

$$Fac(t,m) = QUTS(o,del,bas,m) / PRCM(o,bas,m) \quad (2)$$

where PRCM (o,bas,m) are the deliveries according to DG AGRI data in the base year. Other specification of the adjustment factor might be useful to capture particular circumstances but the two country groups mentioned will determine the default specification.

CAPRI also handles quotas on direct sales, which are identified on position "HCOM"[6] in the revised CAPRI database. The "subsistence" components are identified as "LOSM"(= human consumption on farm) and "FEDM" (= feed

6 It will be noted that the CAPRI data for direct sales correspond directly to DG AGRI data, whereas there are some differences for deliveries according to DG AGRI data (column 'deliveries' in Table 3) and in the CAPRI database (column 'PRCM' in Table 3). The latter builds on the delivery data from Eurostat which are rendered consistent with the milk fat and protein balances in the dairy sector Therefore they cannot be adjusted easily whereas the incorporation of the direct sales from DG AGRI only required some shifting between final demand categories to maintain closed market balances while still including DG AGRI data (see Annex 7 on fat and protein balances).

Table 3: Dairy quotas and raw milk use components according to DG AGRI and CAPRI for 2005 [thousand tonnes]

	Deliveries quota	Deliveries	Modelling	PRCM	Direct sales quota	Direct sales	HCOM	LOSM + FEDM
Belgium-Lux.	3510	3539	return to quota	3180	69.2	35.9	35.9	197.2
Denmark	4455	4452	return to quota	4454	0.5	0.4	0.4	117.2
Germany	27768	27965	stable deviation	27442	95.4	50.8	50.8	1155.7
Greece	820	776	return to quota	648	0.8	0.8	0.8	126.7
Spain	6050	6064	return to quota	6095	67.1	64.7	64.7	496.2
France	23880	23573	stable deviation	23292	355.6	287.7	287.7	1124.8
Ireland	5392	5297	return to quota	5061	4.2	3.7	3.7	91.7
Italy	10284	10891	stable deviation	10636	246.0	265.3	265.3	738.7
Netherlands	11000	10993	return to quota	10479	74.4	76.8	76.8	289.8
Austria	2636	2720	stable deviation	2711	114.3	73.5	73.5	398.9
Portugal	1912	1935	return to quota	1857	8.7	6.4	6.4	198.3
Finland	2400	2362	stable deviation	2373	7.9	1.9	1.9	70.0
Sweden	3300	3152	stable deviation	3140	3.0	2.8	2.8	41.3
United Kingdom	14486	14146	stable deviation	13734	123.7	176.2	176.2	324.3
Czech Republic	2679	2696	stable deviation	2592	3.2	2.6	2.6	93.1
Estonia	604	569	return to quota	568	20.1	8.6	8.6	87.6
Cyprus	142	144	stable deviation	133	2.8	2.8	2.8	11.5
Latvia	678	568	return to quota	494	17.8	10.7	10.7	277.3
Lithuania	1520	1249	return to quota	1195	126.7	56.1	56.1	587.4
Hungary	1835	1581	stable deviation	1538	112.4	19.3	19.3	360.1
Malta	49	41	stable deviation	40	0.0	0.0	0.0	1.9
Poland	8784	8932	stable deviation	8886	179.6	195.1	195.1	2838.5
Slovenia	533	509	stable deviation	519	27.2	20.1	20.1	127.9
Slovakia	1005	981	stable deviation	870	8.3	3.7	3.7	74.8

Source: DG AGRI data (C4 Unit, personal communication, 15/10/2008) for 2007.

CAPRI data (PRCM = Processing on the market = deliveries, HCOM = human consumption on market = direct sales, LOSM = losses and human consumption on farm, FEDM = feed use on farm) are based on Eurostat but require some balancing for overall consistency with model equations. Therefore there are some differences between the DG AGRI data and the CAPRI data, but these are taken into account when including the milk quotas in the model.

use of raw milk on farm), which are projected according to the default trends, but with an upper bound declining by 2% each year. In other words subsistence demand is assumed to decline by 2% each year unless the past trends suggest an even stronger decline. This will complete the tight framework for the change in milk production in the baseline (as CAPRI demand components PRCM and HCOM will be determined by future quotas).

3.1.2 Market intervention

Due to the bilateral trade presentation in the CAPRI market model, the number of variables and equations will increase quadratically with the number of regions. Therefore, in CAPRI the countries in some regions (e.g. in the EU-15) are "clustered" to trade blocks. The model captures trade flows, transport costs, tariffs, export subsidies and import prices at the level of these trade blocks.

Table 4: Market intervention measures in the base year (three-year average 2003-2005) and baseline scenarios

	PADM base year	PADM baseline	FEOE base year	FEOE_MAX
Butter	3052	2461	376	948
SMP	2055	1747	99	276
Cheese	3509	3096	174	342
Beef meat	1560	1560	189	1254

Source: CAPRI database based on regulations and WTO notifications. PADM in Euro per tonne, INTM in thousand tonnes and FEOE_MAX in million Euro.

However, a trade block can be broken down to individual countries with own behavioural equations. Accordingly, in CAPRI all market intervention in the dairy market takes place in the EU-15, and products from the EU-10 and EU-2 (Bulgaria and Romania) are included by their accession to the single market (free trade with the EU-15). There are intervention purchases for butter, SMP and beef[7], and export subsidies apply for the same set of products plus cheese. Table 4 shows the administrative price (PADM), observed export subsidy outlays (FEOE) and maximum subsidized export value (FEOE_MAX) for those products in the base year. In the baseline, however, FEOE_MAX is unchanged due to the assumption of no new WTO agreement, thus the column holds for both base year and 2020 scenarios. Note that the 'intervention price' for cheese is a hypothetical value derived from milk fat and protein contents and the intervention prices for butter and SMP. It is used to steer the endogenous adjustments of export subsidies for cheese with the same methodology as for butter and SMP.

3.1.3 *Export subsidies*

The modelling of export subsidies is based on the assumption that there is a monetary ceiling on the total amount of export subsidies (FEOE_Max), and that export subsidies will be paid per tonne of product exported if the market price drops below the administrative price. The total amount of subsidies is governed by a sigmoid function (i.e. S-shaped function) that gives a total export subsidy between zero and FEOE_Max for any market price. The amount per tonne is calculated by dividing the total subsidy by the sum of export flows.[8]

3.1.4 *Import tariffs*

CAPRI features both ad-valorem and specific tariffs, and furthermore distinguishes preferential tariff rates and MFN rates. For many products, there is a TRQ for imports under a reduced tariff. In CAPRI there can be TRQs for specific tariffs and ad-valorem tariffs and the TRQs can be bilateral (applying only for a unidirectional trade flow between a specific pair of regions) or global (applying to all imports regardless of their regional source). Furthermore, the TRQ may be unlimited, allowing for constructions of free trade agreements. Data for the tariff rate quotas come directly from the relevant regulations (for the EU) or from the Agricultural Market Access Database[9] and expert data (for the Rest of the World).

Regarding tariffs, the main scenario assumptions in this analysis are that in the baseline but not in the base year, the EU-10 and EU-2 are a part of the single market of the EU-15 and, thus, share the same tariff structure. As a compensation to third countries, the following market access changes for dairy products are introduced:

7 Beef market intervention is included here, since it is related to the dairy market.

8 Details of the sigmoid function can be found in Britz, Heckelei and Kempen (2007, section 5.4.9).

9 Access under www.amad.org

Table 5: Core assumptions regarding direct payments in the base year and baseline scenarios

Instrument	Base year	Baseline
Direct payments EU-15	As defined in agenda 2000	2003 reform fully implemented
Direct payments EU-10	None	2003 reform fully implemented, special accession conditions recognised
Direct payments EU-2	None	SAPS
Set aside EU-15	10%	Abolished
Set-aside EU-10 and EU-2	None	Abolished
Article 69 payments	None	Implemented
Modulation	None	EU-25: 5% minus franchise, EU-2 none; Voluntary modulation for UK and Portugal

1. The MFN tariff for butter is lowered from 2962 (the base year) to 1896 €/tonne in the baseline.
2. The MFN tariff for SMP is lowered from 1485 (the base year) to 1188 €/tonne in the baseline and there is an expanded global TRQ from 39.8 to 68 ktonne.
3. The MFN tariff for cheese is lowered from 2630 (the base year) to 1510 €/tonne in the baseline and there is an expanded global TRQ from 34 to 102 ktonne.
4. The 'Everything But Arms' (EBA) initiative grants unlimited market access for the least developed countries in the baseline but not in the base year.
5. The bilateral TRQs for imports from Morocco to the EU are increased step by step.

3.1.5 Direct payments

The central element of the Luxembourg Agreement on the MTR in 2003 was the decoupling of direct payments (for the dairy sector related to a lowering of the target price for milk). The reform was carried out in several steps, with the introduction of coupled dairy payments (i.e. direct payments coupled to dairy farming) as an intermediate stage (cf. section 2.2). In the base year scenario of CAPRI (three-year average 2003-2005) the Agenda 2000 reform is fully implemented but the 2003 Luxemburg agreements on the MTR are not yet effective (slightly higher protection of dairy and sugar markets). In the baseline scenario (year 2020) the Luxemburg agreements are fully implemented and further reforms on single markets (tobacco, olive oil and cotton sectors), the reform of the sugar quota, a 2% expansion of milk quotas in 2008 and the abolition of obligatory set-aside are included.

Member States had the possibility of maintaining certain maximum shares of certain payments in the old coupled form, following a scheme published in regulation 1782/2003. Furthermore, article 69 of that regulation allows coupling of 10% of the total payment ceilings for sub-sectors. In CAPRI, the decoupled payments are modelled as payments per hectare of land, with the same amount per hectare applying regardless of the production chosen (in reality in some cases the eligibility of potatoes and fallow land is limited). The partial coupling of direct payments to dairy farming has been implemented in the baseline. The amounts of the payments are considered a simulation outcome, because they depend on production and they are thus presented in the section of scenario results. The core assumptions regarding the implementation of the direct payments are summarised in Table 5.

3.2 Definition of scenarios

This section presents the main characteristics of the scenarios to be analysed in section 4. These scenarios have been built in the CAPRI model to help the quantitative analysis of a potential removal of the milk quota and are summarised in Table 6. The acronyms S1, S2, S3 and S4 will be further used in this report as reference.

Table 6: Definition of scenarios to be analysed

	Current policy (stand 2004)	Luxembourg Agreement, fully implemented	Quota abolition (in 2020)
Base year (2004)	Scenario S1: "Ex-post"	Scenario S2: "Policy Shift"	–
Future (2020)	–	Scenario S3: "Baseline"	Scenario S4: "Milk Quota Abolition"

Scenario S1 "Ex-post" corresponds to the situation of the agricultural sector in the base year (i.e. 2004)[10]. In that year, the reforms of Agenda 2000 were fully implemented, whereas the 2003 agreements on the MTR were not yet effective. This means that in this scenario the dairy and sugar markets were slightly more protective than after the implementation of the Luxembourg Agreement in 2003, and direct payments were still coupled to production. Market access for developing countries was provided for by the EBA agreement and the EU-10 and EU-2 were not yet fully part of the single market. Further details regarding the implementation of direct payments into scenario S1 can be obtained in Table 5.

Scenario S2 simulates ex-post the effects of the introduction of the legislation ratified in year 2004. Scenario S2 includes the central elements for the dairy sector of the Luxembourg Agreement in 2003, namely the decoupling of direct payments together with a stepwise reduction of intervention prices for butter and SMP. It also includes the application of the CAP to EU-2 after enlargement, further reforms on single markets (tobacco, olive oil and cotton sectors), the reform of the sugar quota, a 2% expansion of milk quotas in 2008 and the abolition of obligatory set-aside (see Table 5). Scenario S2 is a rather artificial scenario, designed mainly to separate the effect of the ex-ante policies from technical progress and other trend effects occurring over the long-term. Due to its high degree of abstraction and rather minor direct relevance to the analysis of milk quota abolition, results of scenario S2 will not be further analysed in this report.

The baseline **scenario S3** corresponds to the simulated market situation in year 2020. Scenario S3 assumes the same policy setting used in scenario S2. Expert judgements and trend analysis are then combined in CAPRI to provide a scenario baseline that will be used as comparison point for policy impact analysis. The baseline scenario S3 may be interpreted as a projection in time, covering the most probable future development of the EU agricultural sector under the *status quo* policy and including all future changes already foreseen in the current legislation (i.e. full implementation of the Luxembourg Agreement. Expert data on future trends at EU level are obtained from the European Commission's medium term projections, while for non-EU regions and for exogenous drivers data is obtained from FAO and World Bank (see Table 7). The obtained information together with own trend projections generated by using time series from the current CAPRI database are fed into an estimator which chooses the most likely combination of forecast values subject to a larger set of consistency restrictions (like for example closed area and market balances, feed requirements, production quotas, composition of cattle herds, etc.). This methodology ensures the mutual compatibility between the projected variables and expert knowledge[11].

10 For production and economic data CAPRI works with a three-year average (2003-2005), whereas policies are defined for each single year.

11 For this study, statistical information on milk deliveries, export subsidies, intervention stocks for dairy products and, most importantly, medium-term projections for dairy markets have been provided by DG AGRI. Therefore, the baseline scenario (S3) was calibrated to be as much in line as possible with the medium term market projections of DG AGRI used in their own assessment of milk quota abolition (European Commission, 2008).

Scenario S4 is conducted to represent the effects of milk quota abolition. It is a counterfactual scenario to scenario S3, i.e. with other policy elements being equal to scenario S3. Scenario S4 enables the comparison of possible differences between S3 and a milk quota removal taking place in year 2015. As scenario results are generated for the year 2020, the dairy sector is assumed to have adjusted to the new market environment between 2015 and 2020.

Table 7: Exogenous drivers considered for shifting the base year to the baseline year

Exogenous drivers	Value / Source
Inflation	1.9 % per annum
Growth of GDP per capita	2.0 % nominal per annum for the EU10, 5 % for India, 1.5 % for USA, 4 % for Russia, 1.5 % for Least Developed countries and ACPs, and 1 % for the rest.
Demographic changes	EUROSTAT projections for Europe and UN projections for the rest of countries in the world
Technical progress	0.5% input savings per annum (affecting exogenous yield trends), with the exemption of N, P, K needs for crops where technical progress is trend forecasted
Domestic Policy	National decisions on coupling options and premium models, with their expected implementation date
Common Market Organisations	Supply and demand forecasts (European Commission, 2007) Projections for dairy markets (European Commission, 2008)
Dairy Markets	Prices, supply and milk quota rent forecasts (EDIM model, Réquillart et al. 2008) Projections for dairy markets (European Commission, 2008)
Trade policy	Final implementation of the 1994 Uruguay round plus some further elements as NAFTA. This raw information is found in AMAD and, after some treatment for data consistency, mapped into CAPRI
World markets	Supply and demand for raw products (FAOSTAT2) Supply and demand for processed commodities (AGLINK model) Price forecasts (FAPRI model, release 2007)

4. Economic effects of milk quota abolition

As an explicit focus of this report is on the regional effects in the EU-27 of a milk quota abolition in year 2015 (simulation results in year 2020), conclusions can predominantly be drawn by comparing the results of scenario S4 and scenario S3. Results of scenario S1 will also be commented because of their calibration nature (i.e. reproduction of statistical data). As scenario S2 was mainly elaborated for technical purposes, results remain of a technical nature (i.e. ex-post behaviour of the model to policy changes) and are therefore not further commented in the report.

4.1 Analysis of the baseline scenario

4.1.1 Summary

In this section two important scenarios for the analysis of milk quota abolition are analysed: scenario S1 ("base year scenario") for a three-year average around 2004 (i.e. the 2003-2005 average) and scenario S3 ("baseline scenario") for year 2020. Both scenarios are pure calibration scenarios, i.e. they are constructed to parameterise the economic model by reproducing a given data set, either an existing database for the base year situation (e.g. EUROSTAT) or expert projections for the baseline (e.g. DG AGRI expert data and EDIM model projections for EU dairy markets). Therefore, a thorough cross-checking of statistical data and expert estimates has been carried out[12].

Baseline simulation results show a milk production increase by 1.0% in the EU-27 between 2004 and 2020, including a change in dairy cattle of -12.7% and yield increase of +15.8% (see Annex 3.2 for a comparison with existing baseline projections at DG AGRI).

4.1.2 Dairy cattle sector

When comparing results of S1 to S3 it can be seen that the combination of policy developments and market trends allows milk production to increase between 2004 and 2020 by 1.0% in the EU-27. This increase only partially follows the agreed milk quota expansion of 2% in 2008 for the EU-27 and also incorporates some decreases in production in the NMS due to a decline in subsistence production, mainly observed in Poland, Bulgaria and Romania[13]. In Table 8 it can be observed how milk yield is foreseen to increase by 15.8% between 2004 and 2020, due to technical progress[14]. In order to comply with the milk quota framework this is accompanied by a parallel decrease in dairy cattle herds of -12,7% (cf. Figure 7 for a regional perspective).

The regional effects on dairy cattle numbers are derived from the heterogeneities within the Member States regarding animal number statistics (REGIO domain, EUROSTAT). We can say that the regionalisation of baseline results follows the same methodological approach as for the base year (see Britz 2008). In this study no expert data at regional level is entering the model, therefore, regional results are driven by historical trends on

12 It is important to say that the storyline behind the comparative analysis of these two scenarios is not other than the one given by the data sets to which they are calibrated to DG AGRI outlook for income and agricultural markets (European Commission 2007). With this objective, an intensive cross-checking of statistical data and simulated results has been done in order to achieve a baseline consistent with the underlying market prospects of DG AGRI. In an exercise of this magnitude, it is important to take into account that the expert data used for the generation of the baseline are at Member State or European level (not regional level).

13 See Annex 5 for further details on the effects of milk use on farm and losses on overall milk delivery trends.

14 This increase in yields is based on past trends. It is important to take into account that a long-term scenario leads to greater potential increases in yields. No bound has been set on this variable.

Table 8: Changes in dairy herds, yields, and cow milk production, 2004-2020

	Base year (S1)			Baseline (S3)			Baseline / Base year CAPRI		
Dairy herd	Dairy herd [1000 hd]	Yield [kg/hd]	Production [1000 t]	Dairy herd [1000 hd]	Yield [kg/hd]	Production [1000 t]	Dairy herd [% to S3]	Yield [% to S3]	Production [% to S3]
Austria	552	5842	3223	445	7170	3193	-19.3	22.7	-0.9
Belgium-Lux.	610	5642	3444	524	6603	3460	-14.2	17.0	0.4
Denmark	578	7950	4599	519	9092	4715	-10.4	14.4	2.5
Finland	327	7512	2458	283	8906	2518	-13.6	18.6	2.4
France	3942	6270	24717	3473	7244	25157	-11.9	15.5	1.8
Germany	4316	6641	28664	3887	7538	29297	-10.0	13.5	2.2
Greece	150	5104	768	128	6076	776	-15.1	19.0	1.1
Ireland	1142	4635	5292	1066	5036	5369	-6.6	8.7	1.5
Italy	2069	5444	11263	1857	6110	11343	-10.3	12.2	0.7
Netherlands	1517	7200	10924	1366	8185	11179	-10.0	13.7	2.3
Portugal	328	6229	2043	286	7180	2056	-12.7	15.3	0.6
Spain	1098	6038	6628	931	7048	6563	-15.2	16.7	-1.0
Sweden	401	8028	3216	360	9198	3314	-10.0	14.6	3.1
United Kingdom	2106	6958	14657	1883	8001	15063	-10.6	15.0	2.8
EU15	19137	6370	121896	17007	7291	124003	-11.1	14.5	1.7
Cyprus	26	5951	153	24	6304	150	-7.4	5.9	-1.8
Czech Republic	412	6394	2633	326	8320	2713	-20.8	30.1	3.0
Estonia	113	5620	636	98	6840	670	-13.4	21.7	5.3
Hungary	288	6547	1887	244	7720	1882	-15.4	17.9	-0.2
Latvia	174	4369	761	171	4843	827	-2.1	10.9	8.5
Lithuania	423	4230	1790	366	5206	1903	-13.6	23.1	6.3
Malta	7	5592	40	7	6696	44	-8.4	19.7	9.5
Poland	2656	4428	11759	2030	5577	11322	-23.6	25.9	-3.7
Slovac Republic	155	6053	936	144	7194	1037	-6.8	18.9	10.8
Slovenia	128	5140	659	111	6103	676	-13.6	18.7	2.6
10 New MS	4382	4851	21254	3519	6031	21222	-19.7	24.3	-0.2
Bulgaria	363	3644	1322	342	3686	1260	-5.8	1.2	-4.7
Romania	1502	3412	5124	1289	3623	4671	-14.1	6.2	-8.8
Bulgaria/Romania	1864	3457	6446	1631	3636	5931	-12.5	5.2	-8.0
EU27	25383	5893	149596	22157	6822	151156	-12.7	15.8	1.0

regional herd sizes and yields, being the average change in the Member States (as presented in Table 8) held as constant.

In order to shift quota rents from the base year in 2004 (estimated) to the baseline in 2020, simulation results of the EDIM model are used (see Réquillart *et al.* 2008). Table 9 presents detailed information on milk prices and quota rents per Member State for the base year and baseline scenarios. Additional information on regional quota rents is included in the Annex 1.

In Table 9 two blocks have to be differentiated, the EU-15, with a longstanding quota regime, and the NMS, which entered the milk quota regime with the accession in the EU:

– In the EU-15 quota rents vary from 2-4% in Finland, Sweden and the UK, as the countries with lowest quota rents, to more than 30% in the Netherlands, Greece and Austria in the base year. Quota rents are assumed to decrease on average by 2.7% in the baseline, with the main underlying economic reason for the decrease being the increases in quotas after the base year.
– In the EU-12 milk quota rents are almost zero in the base year situation for the EU-10 (as this was the immediate time after accession) and zero for the EU-2 (as to that date Bulgaria and Romania were not yet in the EU). In the 2020 baseline, quota rents are assumed within a range of 5-10% for all NMS apart from Bulgaria and Romania, which remain with milk production under quota, and Poland and Hungary, with quota rents above average (15% and 13% respectively).

Figure 7: Dairy cow herd size changes in the baseline, 2004-2020

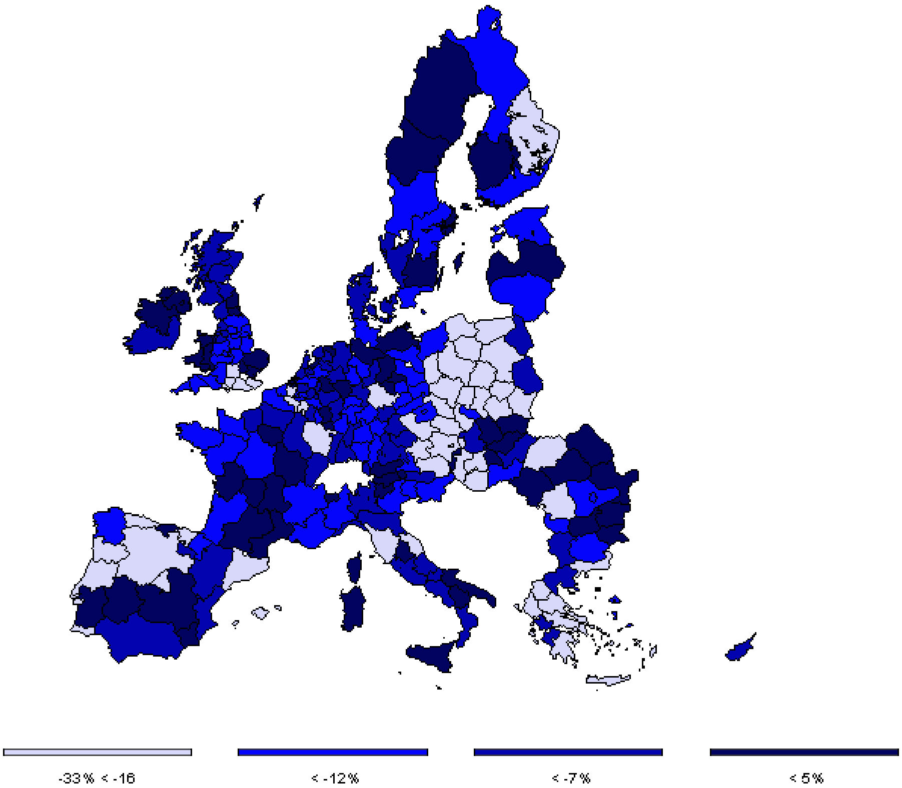


Table 9: Price changes and quota rents, 2004-2020

	Base year (S1)			Baseline (S3)			Baseline/Base year CAPRI		
Quota rents	Milk Price [€/ton output]	Qrent [%]	Qrent [€/ton]	Milk Price [€/ton outpu	Qrent [%]	Qrent [€/ton]	Milk Price [% to S1]	Qrent [diff. to S1]	Qrent [diff. to S1]
Austria	252.0	30.1	75.9	281.7	29.9	84.2	11.8	-0.2	8.4
Belgium-Lux.	256.0	28.1	71.9	285.4	27.6	78.7	11.5	-0.5	6.8
Denmark	308.4	12.5	38.7	332.8	9.3	31.1	7.9	-3.2	-7.6
Finland	341.7	2.2	7.4	379.1	3.5	13.2	11.0	1.3	5.8
France	274.3	17.1	46.8	300.0	12.6	37.7	9.4	-4.5	-9.1
Germany	281.4	16.5	46.3	313.0	17.8	55.7	11.2	1.3	9.4
Greece	324.9	35.1	114.0	357.8	11.7	41.9	10.2	-23.4	-72.1
Ireland	260.3	24.6	64.0	284.2	20.9	59.4	9.2	-3.7	-4.6
Italy	339.6	20.0	67.8	369.5	14.0	51.5	8.8	-6.0	-16.2
Netherlands	318.5	32.9	104.9	353.8	27.8	98.2	11.1	-5.2	-6.7
Portugal	297.6	17.5	52.1	334.9	10.4	34.7	12.5	-7.1	-17.3
Spain	275.6	28.0	77.0	305.9	22.3	68.1	11.0	-5.7	-8.9
Sweden	312.0	4.2	13.2	341.4	3.0	10.3	9.4	-1.2	-2.9
United Kingdom	254.0	3.9	10.0	277.6	3.2	8.8	9.3	-0.8	-1.2
EU15	286.2	18.1	51.8	315.2	15.4	48.6	10.1	-2.7	-3.3
Cyprus	387.1	1.0	3.9	460.7	5.9	27.0	19.0	4.9	23.1
Czech Republic	242.7	1.2	2.9	282.4	9.6	27.1	16.4	8.4	24.2
Estonia	201.1	1.3	2.6	245.0	6.2	15.1	21.8	4.9	12.6
Hungary	254.3	1.4	3.5	269.8	12.8	34.4	6.1	11.4	31.0
Latvia	157.4	2.1	3.3	196.3	6.9	13.6	24.7	4.8	10.3
Lithuania	151.9	5.0	7.7	182.7	9.9	18.1	20.2	4.9	10.5
Malta	334.5	1.0	3.4	365.2	5.8	21.3	9.2	4.8	17.9
Poland	175.0	2.7	4.7	212.8	14.6	31.1	21.6	11.9	26.4
Slovac Republic	242.6	1.2	2.8	276.9	6.0	16.7	14.2	4.9	13.9
Slovenia	235.3	3.3	7.7	258.8	8.1	21.1	10.0	4.8	13.3
10 New MS	195.3	2.3	4.5	231.1	11.9	27.4	18.3	9.6	23.0
Bulgaria	193.7	0.0	0.0	233.7	8.9	20.8	20.6		
Romania	187.4	0.0	0.0	173.2	13.8	23.8	-7.6		
Bulgaria/Romania	188.7	0.0	0.0	186.1	12.5	23.2	-1.4		
EU27	269.1	15.9	42.9	298.3	15.0	44.6	10.9	-1.0	1.7

Figure 8: Regional distribution of milk quota rents in percentage of milk price, baseline scenario, year 2020

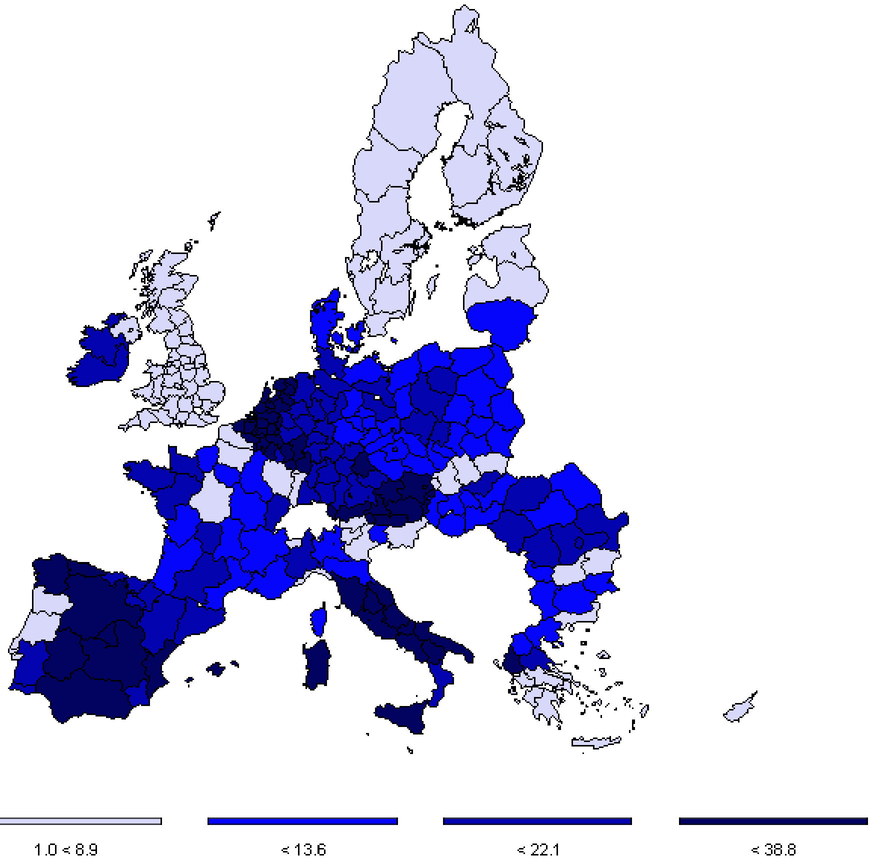


Figure 8 presents the regional distribution of milk quota rents in the baseline scenario for the year 2020. Whereas in the NMS the regional distribution is assumed fairly homogeneous within a MS, in the EU-15 there are large differences between regions inside a MS. In order to arrive to these numbers, the shifters calculated at MS level (as explained above) are used on the regionally estimated quota rents for the base year. The higher variability within MS of the EU-15 partly reflects the availability of statistical information which permitted more detailed assessments for the EU-15 than for most NMS.

4.1.3 Dairy processing sector

In this section, the development of market balances for the main dairy commodities between the base year and baseline simulation are presented. It is important to note that the results presented do not follow a rigorous economic reasoning based on a given model for dairies. Over time there will be changes in processing technology and costs other than raw milk, such that the results are coming from projections (either trend based or expert-driven information). Only once the target year 2020 is reached, the dairy model parameters are 'frozen' to allow for economic analysis. Within simulation scenarios the dairy industry is then assumed to process raw milk into processed dairy products based on a given technology such that profits are maximised. Important elements of this technology are the balances on milk fat and protein and their content in various products (fat and protein content of butter, cheese etc.).[15] In equilibrium the price of dairy products corresponds to the value of their fat and protein content plus other marginal costs (for labour, capital, energy). If the price of raw

15 See Annex 7 for some explanations on the balancing of fat and protein in the model.

Table 10: Market results of the baseline: butter, 2004-2020

	Base year (S1)				Baseline (S3)				Baseline vs. Base year		
Butter	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
Austria	3477	32.0	41.5	-9.5	3282	21.6	35.5	-14.0	-32.6	-14.4	-4.5
Belgium-Lux.	2648	116.3	107.7	8.5	2499	125.4	109.6	15.8	7.8	1.7	7.3
Denmark	3122	101.2	87.3	13.8	2947	89.2	76.1	13.2	-11.8	-12.9	-0.7
Finland	2487	50.8	36.1	14.7	2348	46.1	32.5	13.6	-9.2	-10.0	-1.1
France	3721	421.6	484.7	-63.1	3512	368.4	501.7	-133.3	-12.6	3.5	-70.2
Germany	2807	439.1	525.0	-85.9	2649	388.7	479.4	-90.6	-11.5	-8.7	-4.7
Greece	4425	2.0	8.7	-6.7	4177	0.7	8.7	-7.9	-63.5	0.0	-1.3
Ireland	3045	145.5	13.0	132.5	2874	152.2	13.8	138.4	4.6	6.1	5.9
Italy	3121	121.9	166.9	-45.1	2946	137.5	169.2	-31.7	12.8	1.3	13.4
Netherlands	2407	245.4	152.8	92.7	2272	215.2	154.3	60.9	-12.3	1.0	-31.7
Portugal	3186	26.0	17.6	8.3	3007	28.4	14.5	13.9	9.4	-17.9	5.6
Spain	2292	46.5	41.9	4.6	2164	35.5	38.4	-2.9	-23.6	-8.3	-7.5
Sweden	2968	47.5	38.2	9.3	2801	36.9	32.2	4.7	-22.4	-15.9	-4.6
United Kingdom	2320	126.1	193.9	-67.7	2190	104.4	171.4	-67.0	-17.2	-11.6	0.7
EU15	2971	1921.8	1915.4	6.4	2804	1750.1	1837.0	-86.9	-8.9	-4.1	-93.3
Cyprus	4067	0.2	1.4	-1.2	3845	0.2	1.3	-1.1	-25.0	-5.7	0.0
Czech Republic	2617	53.6	42.6	11.0	2474	40.8	40.2	0.6	-23.9	-5.6	-10.4
Estonia	2019	6.0	5.3	0.7	1909	4.8	3.8	1.0	-20.5	-27.2	0.2
Hungary	2542	7.0	8.8	-1.9	2403	3.0	8.0	-5.0	-57.1	-9.8	-3.1
Latvia	1768	8.2	6.5	1.7	1671	7.0	4.7	2.3	-15.5	-27.8	0.5
Lithuania	2361	12.6	8.3	4.4	2232	9.8	6.4	3.4	-22.7	-22.8	-1.0
Malta	3331	0.2	0.5	-0.3	3149	0.2	0.4	-0.2	-5.3	-8.7	0.0
Poland	2311	119.3	117.9	1.4	2185	117.9	108.0	9.9	-1.1	-8.3	8.4
Slovac Republic	2711	10.1	10.2	-0.1	2563	9.4	7.5	1.9	-7.1	-26.7	2.0
Slovenia	2421	4.3	2.2	2.1	2289	3.8	2.1	1.8	-11.0	-6.8	-0.3
10 New MS	2391	221.5	203.6	17.9	2249	196.7	182.4	14.3	-11.2	-10.4	-3.6
Bulgaria	1891	5.5	5.0	0.5	1794	3.0	4.0	-0.9	-44.6	-20.5	-1.4
Romania	2095	8.6	11.4	-2.7	1987	9.3	8.3	1.0	7.8	-27.0	3.7
Bulgaria/Romania	2016	14.1	16.3	-2.2	1940	12.3	12.2	0.1	-12.5	-25.0	2.3
EU27	2906	2157.4	2135.3	22.1	2743	1959.2	2031.7	-72.5	-9.2	-4.8	-94.6

milk declines, dairies will find that milk fat and protein are cheaper such that production of dairy products is increased. Because the raw product share in the final product value is not equal for all dairy products (e.g. cheese requires more sophisticated processes than butter or SMP), the increase in production would not be uniform. Conversely if the price of a dairy product, such as butter, declines whereas all other prices are constant, the profit maximising dairy industry would try to shift away from butter, producing more cream and whole milk powder rather than SMP to comply with the fat balance in spite of reduced butter production. However, the starting point for any such scenarios is the market situation that has evolved over time and, therefore, in this section the market balances for the main dairy commodities are presented.

The European butter price is predicted to decrease by -5.6% following the drop in fat and protein prices but still remaining above intervention (which was also reduced in the baseline compared to the base year, see Table 4). Production of butter also decreases (-9.2%) due to the larger uptake of milk fat in cheese production (cf. Table 12). As a result of a shift in preferences towards cheese, consumption of butter is also foreseen to decrease (-4.8%) in the EU-27, with a larger effect on NMS (-11.2% in the EU10 and –12.5% in EU-2). This drop in butter consumption is however lower than the decrease in butter production, bringing the EU into a net importer situation (from a slightly positive net trade situation of 22100 tonnes[16] of butter to a negative balance of -72500 tonnes) (cf. Table 10).

16 ZMP would give a 2003-2005 three year average for net trade of EU-27 of 117000 tonnes, which is nearly three times the base year value in CAPRI. This deviation comes from the CAPRI database, where missing Eurostat trade data are estimated with data differently than ZMP statistics. Nevertheless, the starting value does not affect the net

Table 11: Market results of the baseline: SMP, 2004-2020

Skimmed Milk Powder	Base year (S1) Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Baseline (S3) Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Baseline vs. Base year Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
Austria	2200	7.1	3.4	3.7	2601	5.2	3.3	1.9	-26.7	-4.4	-1.7
Belgium-Lux.	2313	88.8	55.4	33.4	2733	98.7	57.8	40.9	11.1	4.3	7.5
Denmark	2010	26.2	18.6	7.5	2376	22.5	11.3	11.1	-14.2	-39.2	3.6
Finland	2227	24.4	24.4	0.1	2632	28.3	25.6	2.7	15.9	5.1	2.6
France	2018	203.5	183.5	20.0	2385	147.0	165.4	-18.5	-27.8	-9.9	-38.5
Germany	2207	268.1	150.7	117.4	2609	192.6	124.6	68.0	-28.2	-17.3	-49.4
Greece	2190	0.0	2.7	-2.7	2588	0.0	2.0	-2.0		-26.9	0.7
Ireland	2189	69.7	30.3	39.4	2587	48.0	22.3	25.7	-31.2	-26.4	-13.7
Italy	2010	0.0	111.0	-111.0	2376	0.0	102.3	-102.3		-7.9	8.8
Netherlands	2094	67.9	164.5	-96.6	2475	50.3	142.8	-92.5	-25.8	-13.2	4.1
Portugal	2188	7.5	11.2	-3.7	2586	5.3	10.7	-5.4	-28.7	-4.1	-1.7
Spain	2169	10.6	18.9	-8.3	2564	8.7	14.5	-5.8	-18.1	-23.3	2.5
Sweden	2186	32.3	32.0	0.3	2584	29.0	29.7	-0.8	-10.2	-7.1	-1.0
United Kingdom	2282	93.0	87.3	5.7	2697	78.7	87.0	-8.3	-15.3	-0.3	-14.0
EU15	2166	898.9	893.9	5.0	2571	714.1	799.4	-85.3	-20.6	-10.6	-90.2
Cyprus	1104	0.0	0.0	0.0	1303	0.4	0.0	0.4	4300.0		0.4
Czech Republic	1840	34.8	4.3	30.5	2172	25.5	4.3	21.1	-26.9	0.7	-9.4
Estonia	1350	10.5	4.8	5.7	1593	7.7	3.2	4.5	-26.8	-33.1	-1.2
Hungary	1856	6.0	2.1	3.8	2191	7.3	1.7	5.6	22.0	-21.3	1.8
Latvia	2422	0.8	0.2	0.6	2859	0.7	0.2	0.5	-16.3	-5.0	-0.1
Lithuania	2121	9.6	0.2	9.4	2503	9.0	0.2	8.8	-5.9	-14.3	-0.5
Malta	2343	0.0	2.1	-2.1	2766	3.8	2.4	1.4	9275.0	10.3	3.5
Poland	1291	118.8	28.9	89.9	1523	147.7	26.9	120.8	24.4	-6.7	30.9
Slovac Republic	2132	8.0	7.2	0.8	2516	9.6	5.4	4.2	20.4	-25.1	3.4
Slovenia	1104	2.2	0.0	2.2	1303	1.0	0.0	1.0	-57.2		-1.3
10 New MS	1491	190.7	49.9	140.8	1719	212.5	44.3	168.3	11.5	-11.2	27.5
Bulgaria	1369	5.1	10.1	-5.0	1619	4.5	9.2	-4.8	-12.4	-8.7	0.3
Romania	2263	5.3	6.3	-1.0	2676	0.9	5.7	-4.8	-82.1	-9.0	-3.8
Bulgaria/Romania	1824	10.3	16.3	-6.0	1803	5.4	14.9	-9.5	-47.9	-8.8	-3.5
EU27	2046	1099.9	960.1	139.8	2373	932.0	858.5	73.5	-15.3	-10.6	-66.3

For SMP, another bulk product, the analysis is quite similar to the case of butter but with more accentuated effects. Prices for SMP are assumed to increase in the baseline by 16% on average and production to decrease by -10% due to the shift of proteins to cheese and fresh milk products. As in the case of butter, demand is also reduced in the baseline (-10%) but to a lesser extent. The net exporting position of the EU-27 remains however much more weakened.[17] (cf. Table 11).

Cheese production is assumed to increase in the EU-27 by 17.7% following a shift in preferences, i.e. demand going up by +14.5% on average, with +35.5% in the EU-10 and +13.8 in the EU-15. This excess supply makes the net trade position of the EU-27 stronger towards the Rest of the World. Within the EU there is a quite heterogeneous picture, since most of NMS and several EU-15 MS are not expected to produce enough cheese to satisfy demand. Nevertheless, the net trade positions within the countries have to be considered as residual positions which depend on the production trends for each MS and the distribution of demand amongst them.[18] (cf. Table 12).

These trends of the baseline are in line with the market outlook for the dairy sector (European Commission 2007).

trade position in the baseline, which is driven by expert predictions (i.e. in this case EDIM market balances).

17 It must be reminded that in CAPRI prices are mainly derived from Eurostat statistics and that the intervention mechanism is not initiated if a particular national market price 'hits' the effective intervention price. Actually it is possible to have national prices below effective intervention prices in the model, as in the baseline price for butter in the UK price (below 2200 Euro, see Table 10).

18 For historical reasons, in CAPRI the EU-15, EU-10 and EU-2 are considered formally separate trade aggregates. The common market is technically achieved by dropping all tariff barriers between these aggregates to zero (cf. section 3.1.2).

Table 12: Market results of the baseline: cheese, 2004-2020

	Base year (S1)				Baseline (S3)				Baseline vs. Base year		
Cheese	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
Austria	4201	147.3	160.9	-13.6	4588	145.0	197.0	-52.0	-1.6	22.5	-38.5
Belgium-Lux.	2851	58.4	206.9	-148.6	3113	66.8	287.0	-220.2	14.5	38.7	-71.6
Denmark	3930	315.9	136.8	179.1	4293	355.2	176.4	178.7	12.4	29.0	-0.4
Finland	3124	99.7	95.2	4.5	3412	125.3	107.9	17.5	25.7	13.3	13.0
France	4579	1853.2	1554.5	298.7	5001	1994.3	1784.8	209.5	7.6	14.8	-89.2
Germany	3164	1857.9	1749.4	108.5	3456	2215.3	1836.9	378.4	19.2	5.0	269.9
Greece	5174	216.3	275.0	-58.7	5651	277.5	339.8	-62.3	28.3	23.5	-3.5
Ireland	4584	116.2	39.5	76.7	5006	133.5	54.4	79.1	14.8	37.7	2.3
Italy	4806	1117.7	1256.4	-138.7	5249	1440.3	1314.4	125.9	28.9	4.6	264.5
Netherlands	3128	679.5	347.4	332.1	3416	773.3	447.7	325.6	13.8	28.9	-6.5
Portugal	4182	80.9	104.9	-24.0	4568	77.0	126.3	-49.3	-4.8	20.4	-25.3
Spain	4181	321.7	418.4	-96.7	4567	397.3	513.2	-115.9	23.5	22.7	-19.2
Sweden	3782	120.5	166.3	-45.8	4130	129.5	208.1	-78.6	7.5	25.2	-32.8
United Kingdom	3825	334.7	556.3	-221.6	4178	344.1	652.4	-308.3	2.8	17.3	-86.7
EU15	3999	7319.8	7067.7	252.1	4370	8474.3	8046.3	428.0	15.8	13.8	175.9
Cyprus	5776	11.1	10.7	0.3	6320	13.7	16.0	-2.3	23.1	48.5	-2.6
Czech Republic	3500	121.6	129.9	-8.3	3829	151.6	165.4	-13.8	24.6	27.3	-5.6
Estonia	2854	24.7	20.1	4.6	3123	30.3	24.4	5.9	22.9	21.8	1.3
Hungary	3502	70.9	63.9	7.0	3832	80.5	66.3	14.3	13.6	3.7	7.3
Latvia	2661	34.8	30.3	4.6	2912	50.1	32.0	18.2	44.0	5.6	13.6
Lithuania	2263	83.4	38.6	44.8	2476	123.1	47.8	75.3	47.5	23.9	30.5
Malta	4609	4.3	8.8	-4.5	5042	5.2	10.9	-5.7	22.0	23.5	-1.1
Poland	2491	534.4	481.0	53.5	2725	761.2	588.6	172.6	42.4	22.4	119.2
Slovac Republic	4076	39.0	33.2	5.8	4459	40.8	39.1	1.7	4.7	17.8	-4.1
Slovenia	3335	23.2	21.1	2.2	3649	27.6	25.5	2.1	18.8	20.9	0.0
10 New MS	2826	947.5	837.5	110.0	3040	1284.2	1015.9	268.3	35.5	21.3	158.3
Bulgaria	2644	85.8	73.4	12.4	2963	85.3	73.8	11.5	-0.6	0.5	-0.9
Romania	2551	56.3	54.7	1.6	2859	53.6	61.6	-8.0	-4.7	12.7	-9.6
Bulgaria/Romania	2607	142.1	128.1	14.0	2923	138.9	135.4	3.5	-2.2	5.7	-10.5
EU27	3843	8409.4	8033.3	376.1	4177	9897.5	9197.6	699.9	17.7	14.5	323.8

4.1.4 Other commodity markets

The tables 13-16 give an overview of the effects on meat markets. The production of beef is projected to decrease by -17.0% due to the reduction in dairy cattle (-12.7%). This is followed by increasing beef meat net imports into the EU due to an increase of 1% in demand. For pig meat, production levels are expected to rise by +7.7%; and for poultry meat, production increases in the range of +25% are projected, reflecting increasing per capita demand. Overall, whereas beef and sheep and goat meat production decrease, pork and poultry meat heavily increase their share in the meat aggregate due to the observed price changes and a shift in preferences towards the latter.

4.1.5 Land use change

The main drivers on land use and their consequences on the baseline may be summarised as follows. In overall agricultural land in the EU-27 is projected to decrease by -4.8% from year 2004 to year 2020. In the arable crop sector, the recent reform of the sugar market leads to a drop in sugar beet area by about -39%, with a reduction in production of –25% as a result of yield increases above 20%. Cereal production is estimated to grow by +6%. The production increase in cereals is mostly fuelled by projected yield increases in the range of +0.7% per annum, which would be accompanied by a slight reduction in cereal areas of -6%, as presented in Figure 9. This further reduction of cereal area with respect to the average reduction in agricultural land in the baseline is partially compensated by an increase of +8% in fallow land (0.9 Mio ha) focused in the NMS (cf. Figure 9).

Table 13: Market results of the baseline: beef, 2004-2020

	Base year (S1)				Baseline (S3)			
Beef	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S1]	Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
EU15	2901	7650	7407	268	42.3	-17.4	2.4	-1538.4
10 New MS	1633	698	611	86	40.6	-15.4	-7.4	-62.3
Bulgaria/Romania	1817	280	302	-22	78.8	-9.0	-19.9	34.7
EU27	2763	8627	8319	332	42.8	-17.0	0.9	-1566.0

Table 14: Market results of the baseline: sheep and goat meat, 2004-2020

	Base year (S1)				Baseline (S3)			
Sheep and Goat Meat	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S1]	Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
EU15	4744	1028	1291	-263	9.2	-20.7	11.7	-363.7
10 New MS	3118	33	24	10	10.0	-4.1	36.1	-9.9
Bulgaria/Romania	2078	144	107	38	39.1	18.8	11.3	15.0
EU27	4379	1205	1421	-216	8.3	-15.6	12.0	-358.6

Table 15: Market results of the baseline: pork meat, 2004-2020

	Base year (S1)				Baseline (S3)		
Pork	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
EU15	1301	17961	16192	1769	9.4	1.7	1408.7
10 New MS	1196	3363	3313	49	4.0	4.1	0.2
Bulgaria/Romania	1611	608	744	-137	-34.6	11.7	-297.3
EU27	1293	21932	20250	1682	7.3	2.4	1111.7

Table 16: Market results of the baseline: poultry meat, 2004-2020

	Base year (S1)				Baseline (S3)			
Poultry Meat	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S1]	Production [% to S1]	Demand [% to S1]	Net trade [diff. to S1]
EU15	1205	8912	8461	451	48.4	23.8	23.5	137.9
10 New MS	1099	1781	1669	112	45.4	44.3	31.0	271.5
Bulgaria/Romania	1771	355	489	-133	-19.5	-47.4	34.8	-338.6
EU27	1206	11048	10618	430	44.9	24.8	25.2	70.8

4.1.6 Income

In the baseline scenario S3, agricultural income for the EU-27 is also expected to increase by +37.6% in nominal terms and per agricultural hectare between 2004 and 2020 (cf. Figure 10). However, it is important to note that:

– the shift between 2014 and 2020 is carried out through historical linear trends, since no more expert data is available for this period; moreover, the prospects do not cover development for permanent crops and fodder, so that the results for those parts of agriculture are mainly driven by historical trends and, in the case of fodder by their interaction with animal production;

– the analysis presents income developments in nominal terms (by taking a 1.9% annual inflation rate, results would be around 35% lower, so that income per hectare of utilisable agricultural area would remain almost constant), and;

Figure 9: Land use changes in the baseline: cereals and fallow land, 2004-2020

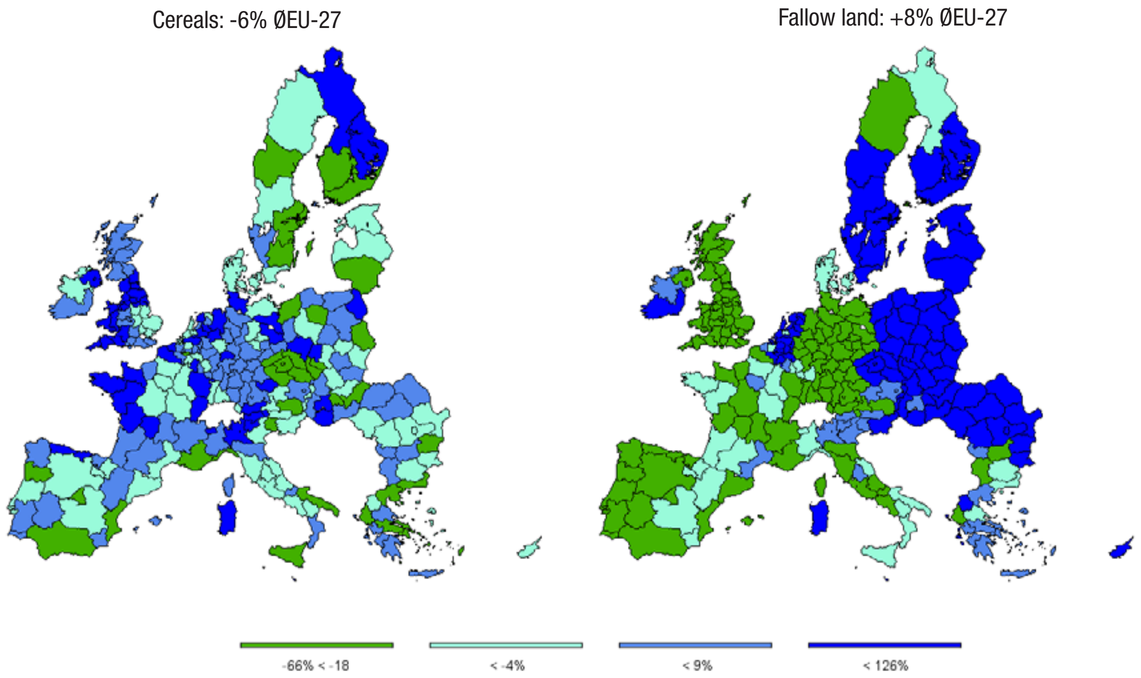
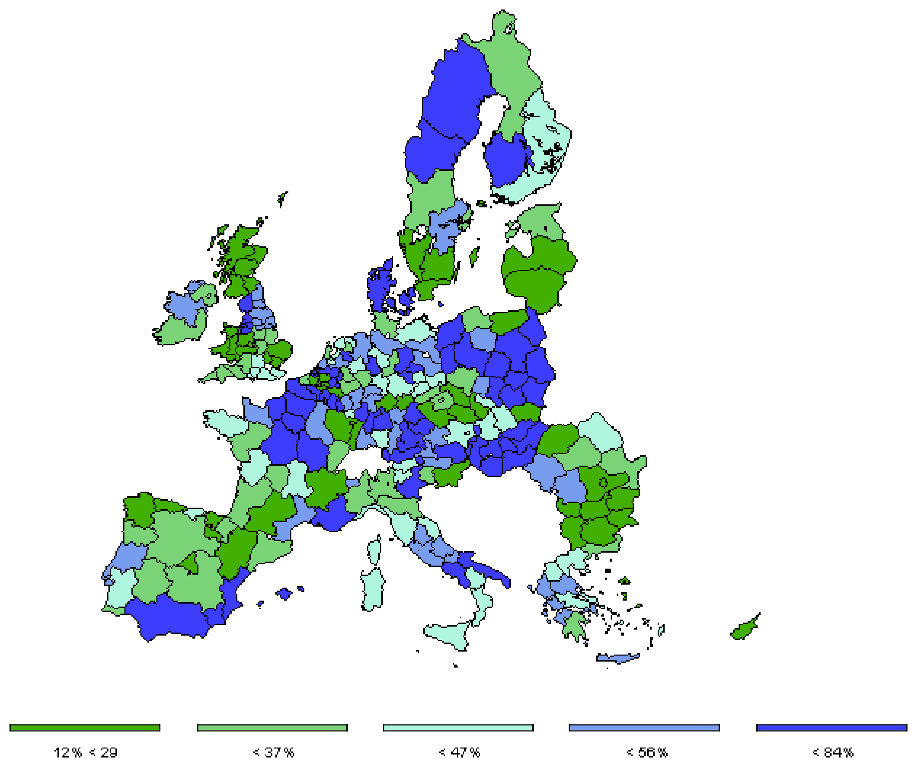


Figure 10: Income changes in the baseline scenario: total agricultural sector, 2004-2020



– income is measured per agricultural hectare, so that income developments here are presented at the low end, since we could assume a further decreasing trend in labour input over time.

Income developments in the baseline are projected to be quite favourable for dairy cattle (+32%), due to lower increases in prices over time (prices increase by +26% for cereals and +11% for cow milk). The development of regional income is quite heterogeneous and depends on the regional production mix, which is in turn linked to exogenously-determined regional trends for market balance positions over time. It is again important to note here, that no economic analysis beyond the use of historical trends is behind these regional patterns. A different set of regional results consistent to the expert information at Member State level could be achieved by assuming a different development of the regional agricultural markets.

4.2 Regional analysis of the milk quota abolition

The following sub-sections try to disentangle the impacts of milk quota abolition, starting at the aggregate level of market impacts at the EU-27 and MS level and then presenting some more detailed results on regional effects within selected MS.

4.2.1 Summary

In this section results of scenario S4 (removal of the milk quota in the year 2015) are compared with results of the baseline scenario S3. The results of both scenarios refer to the year 2020. Overall it can be expected that milk production will increase while milk prices will decrease. However the regional production effects might be heterogeneous. In regions where the quota rent was low in the reference situation the drop in milk price might be below marginal cost, i.e. in those regions production will decrease. In regions where the final milk price remains above marginal cost production will increase. This leads to a redistribution of production among NUTS 2 regions when there are no longer restrictions as implemented by different national quota trade regimes.

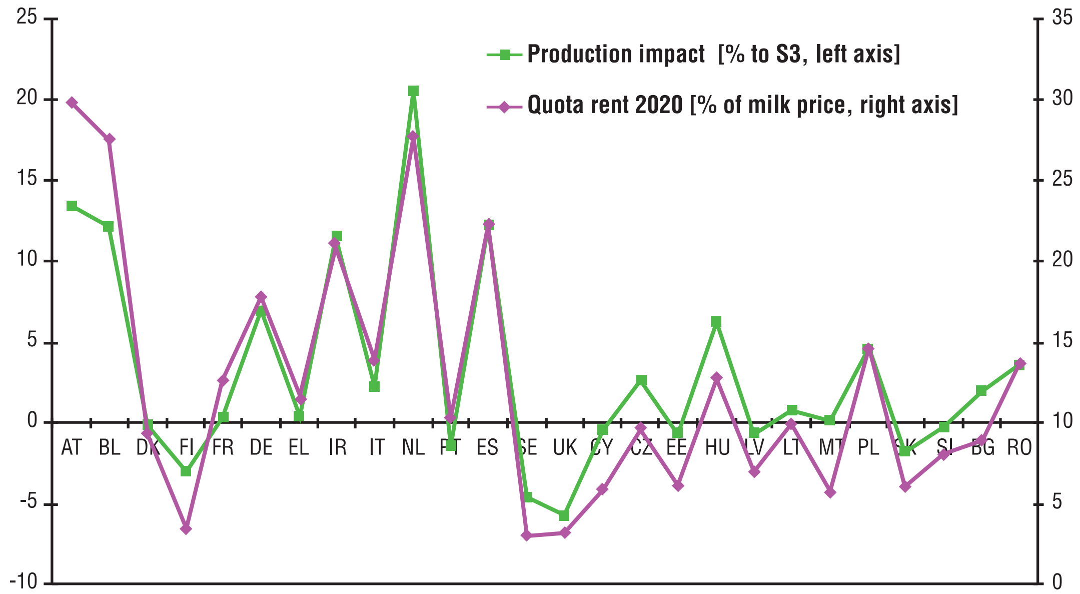
Key results of scenario 4 are that compared to scenario 3, cow milk production would increase by about 4.4% in the EU-27, accompanied by a decrease in raw milk prices of about 10%. Production of the industrial products butter, skimmed and whole milk powder would increase by 5-6% while their prices would decline by about 6-7%. Production of cheese and fresh milk products would increase about 1% whereas their prices could decline by 4-6%. From a regional perspective, the development of milk production is mainly determined by the estimated milk quota rents in the baseline scenario. Regions with high quota rents, such as in Austria (all above 28%), Netherlands (all above 27%), Belgium (Brabant Wallon 38%, the rest above 28%), Luxembourg (29%), and to a lesser extent Italy (Lazio, Molise and Abruzzo above 33%) and Germany (Saarland, Koblenz and Rheinhessen-Pfalz above 32%) increase their milk production significantly. The overall increase of milk production drives down dairy prices in the EU-27 and thus exerts economic pressure on regions with low quota rents (especially to be found in the United Kingdom, Sweden and Finland).

4.2.2 Market impacts at EU and Member State level

Several recent studies have confirmed the key importance of estimated quota rents for the quantitative results obtained in quota abolition scenarios[19]. This study has therefore devoted

19 See for example Réquillart V., Bouamra-Mechemache Z., Jongeneel R. (2008): Economic analysis of the effects of the expiry of the EU milk quota system, Institut d'économie industrielle, Université Toulouse 1, http://ec.europa.eu/agriculture/analysis/external/milk/full_text_en.pdf and Witzke H.P., Tonini A. (2008): Dairy reform scenarios with CAPSIM acknowledging quota rent uncertainty, paper presented at the 12th EAAE Congress, Ghent, Belgium.

Figure 11: Quota abolition impacts on production of cow milk in the EU-27 and baseline quota rents, 2020



considerable efforts to estimate regional quota rents and supply elasticities, to validate the results against information from quota markets and to merge estimation results with this alternative information and plausibility considerations (Pérez Domínguez and Tonini 2008). As may be expected, the final specification of quota rents may be seen also to be a key determinant for the results of scenario 4 (cf. Figure 11).

Figure 11 shows the impact of quota abolition on production of cow milk in the EU-27 (scenario S4 in relation to baseline scenario S3) and the baseline quota rent in the year 2020. The two lines are not perfectly matching because there are also other determinants than quota rent, including dairy industry demand elasticities, regional supply elasticities, but also regional constraints for fodder production and typical feeding patterns. Furthermore aggregation effects from regional heterogeneity also complicate the aggregate analysis. Nonetheless the key message of Figure 11 is straightforward: regional production impacts are crucially depending on the quota rent specification.

The impacts of quota abolition on production are mainly attributable to changes in dairy herds and yield impacts, which will also be shown within the section on regional details later, but are at the same time the starting point for the analysis of aggregate impacts.

Table 17 indicates that the increase in cow milk production, on average in the EU-27 +4.4%, is mainly due to a change in dairy herds whereas milk yields are fairly stable. The increase in dairy herds usually translates into a modest increase of cattle density because other cattle types for fattening will not be affected a lot and suckler cows even decline, as calves prices are driven down by the additional supply from dairy cows. The Netherlands are a special case because cattle other than dairy cows have a low importance and suckler cows are almost missing such that the cattle density would increase by 12.5% whereas the dairy herd would increase by 20%. Given that environmental regulations on manure disposal, which are not reflected in CAPRI, could dampen the expansion of dairy production in the Netherlands the quota rent has been specified

Table 17: Changes in dairy herds, cattle density, yields, and cow milk production, 2020

	Baseline (S3)				Abolition (S4)			
	Dairy herd [1000 hd]	Cattle [LU / ha]	Yield [kg/hd]	Production [1000 t]	Dairy herd [% to S3]	Cattle [% to S3]	Yield [% to S3]	Production [% to S3]
Austria	445	0.41	7170	3193	13.8	3.8	-0.3	13.5
Belgium-Lux.	524	1.19	6603	3460	11.9	2.5	0.3	12.2
Denmark	519	0.38	9092	4715	-0.3	0.4	0.2	-0.1
Finland	283	0.27	8906	2518	-3.2	-1.3	0.2	-3.0
France	3473	0.45	7244	25157	-0.3	-0.9	0.5	0.2
Germany	3887	0.47	7538	29297	6.9	3.5	0.1	7.0
Greece	128	0.09	6076	776	0.0	-1.3	0.4	0.4
Ireland	1066	1.12	5036	5369	11.1	1.4	0.4	11.6
Italy	1857	0.39	6110	11343	1.9	0.2	0.3	2.2
Netherlands	1366	1.23	8185	11179	20.0	12.5	0.5	20.5
Portugal	286	0.31	7180	2056	-0.3	-1.0	-1.1	-1.4
Spain	931	0.25	7048	6563	11.1	0.2	1.0	12.2
Sweden	360	0.31	9198	3314	-4.8	-2.2	0.2	-4.6
United Kingdom	1883	0.43	8001	15063	-5.8	-2.4	0.1	-5.7
EU15	17007	0.41	7291	124003	4.6	0.7	0.1	4.7
Cyprus	24	0.30	6304	150	-0.5	-0.4	0.1	-0.4
Czech Republic	326	0.19	8320	2713	2.7	1.0	-0.1	2.6
Estonia	98	0.20	6840	670	-0.8	0.0	0.2	-0.7
Hungary	244	0.07	7720	1882	6.1	4.0	0.1	6.2
Latvia	171	0.17	4843	827	-0.8	-0.1	0.1	-0.7
Lithuania	366	0.22	5206	1903	0.7	1.1	0.1	0.8
Malta	7	1.10	6696	44	-0.2	-0.8	0.3	0.1
Poland	2030	0.21	5577	11322	4.5	3.4	0.1	4.7
Slovac Republic	144	0.13	7194	1037	-2.0	-1.4	0.2	-1.8
Slovenia	111	0.68	6103	676	-0.4	-0.8	0.1	-0.3
10 New MS	3519	0.18	6031	21222	3.2	2.3	0.1	3.3
Bulgaria	342	0.14	3686	1260	1.4	0.9	0.5	2.0
Romania	1289	0.18	3623	4671	3.0	2.6	0.6	3.6
Bulgaria/Romania	1631	0.17	3636	5931	2.7	2.3	0.6	3.3
EU27	22157	0.35	6822	151156	4.2	1.0	0.2	4.4

to be slightly lower (28%, see Table 18) than the actual estimation result of UNICATT (33%).

Table 18 reports on key drivers and consequences of the milk production increase following a quota abolition. Results indicate that differences of production impacts between MS are to a large extent driven by quota rents (see also Figure 11).

Increasing production exerts downward pressure on producer prices which are declining on average by 10%. As raw milk is poorly tradable, price formation is assumed to occur on the national level such that percentage changes in producer prices may be different between Member States. High production increases tend to trigger strong price drops but dairy markets are here intervening: profitability of dairies and hence equilibrium prices for particular delivery quantities also depend on changing prices of dairy products and on their weights in the national industry. Therefore a decline in raw milk prices can also be expected in those MS where production is likely to decrease. In fact declining dairy prices indirectly depress raw milk prices in the whole EU-27 and explain why production is declining at all in MS with zero or small positive rents in the baseline.

Table 18: Price changes, quota rents and cow milk production, 2020

	Baseline (S3)			Abolition (S4)	
	Price [€/t]	Production [1000 t]	Quota rent [%]	Price [% to S3]	Production [% to S3]
Austria	282	3193	30	-12.4	13.5
Belgium-Lux.	285	3460	28	-14.3	12.2
Denmark	333	4715	9	-8.2	-0.1
Finland	379	2518	3	-4.5	-3.0
France	300	25157	13	-10.9	0.2
Germany	313	29297	18	-11.9	7.0
Greece	358	776	12	-9.5	0.4
Ireland	284	5369	21	-11.7	11.6
Italy	369	11343	14	-9.6	2.2
Netherlands	354	11179	28	-12.7	20.5
Portugal	335	2056	10	-7.1	-1.4
Spain	306	6563	22	-13.2	12.2
Sweden	341	3314	3	-5.0	-4.6
United Kingdom	278	15063	3	-4.7	-5.7
EU15	315	124003	15	-10.3	4.7
Cyprus	461	150	6	-4.4	-0.4
Czech Republic	282	2713	10	-7.3	2.6
Estonia	245	670	6	-5.4	-0.7
Hungary	270	1882	13	-8.6	6.2
Latvia	196	827	7	-5.3	-0.7
Lithuania	183	1903	10	-7.2	0.8
Malta	365	44	6	-2.6	0.1
Poland	213	11322	15	-9.3	4.7
Slovac Republic	277	1037	6	-5.6	-1.8
Slovenia	259	676	8	-6.9	-0.3
10 New MS	231	21222	12	-8.2	3.3
Bulgaria	234	1260	9	-2.5	2.0
Romania	173	4671	14	-2.2	3.6
Bulgaria/Romania	186	5931	12	-2.3	3.3
EU27	298	151156	15	-9.8	4.4

Moving to the market results for dairy products Table 19 shows that within each sub-aggregate of EU-27, that is EU-15, EU-10 and EU-2, prices are assumed to change in equal percentages. This is certainly a simplifying assumption. However, Witzke and Tonini 2008 (and EuroCARE 2008) also report small differences in price changes of dairy products in spite of strong differences in raw milk price changes because the former are well tradable whereas raw milk cannot be traded cheaply over long distances. Furthermore Réquillart *et al.* 2008 report price changes between the baseline and their milk quota abolition scenario Q1 for 2020, varying from -7.4% (United Kingdom) to -14% (Netherlands) for raw milk whereas the variation for butter price changes is only from 3.4% (Sweden) to 4.8% (Netherlands) in the EU-15. Hence the assumption of proportional price changes for dairy products within trading blocks is a simplification, but not an inadequate one. Note that the treatment of EU-2 as a separate modelling region allows prices to move a bit different from the EU-10 and the EU-15, but nonetheless this acknowledges the tariff union effect of including both countries in the Common Market.

Another issue that needs explanation is the relationship of butter prices in MS of the EU-27 in 2020 to the effective intervention price (IP) for

Table 19: Market results of quota abolition: butter, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
Austria	3282	22	36	-14	-6.7	1.1	2.2	-0.6
Belgium-Lux.	2499	125	110	16	-6.7	11.6	6.5	+7.3
Denmark	2947	89	76	13	-6.7	-0.9	11.2	-9.3
Finland	2348	46	32	14	-6.7	-5.1	1.4	-2.8
France	3512	368	502	-133	-6.7	-2.0	0.8	-11.4
Germany	2649	389	479	-91	-6.7	8.4	2.0	+22.9
Greece	4177	1	9	-8	-6.7	4.9	1.3	-0.1
Ireland	2874	152	14	138	-6.7	10.7	3.9	+15.8
Italy	2946	137	169	-32	-6.7	0.1	0.8	-1.2
Netherlands	2272	215	154	61	-6.7	18.7	1.1	+38.5
Portugal	3007	28	14	14	-6.7	-5.1	1.4	-1.7
Spain	2164	35	38	-3	-6.7	5.3	1.4	+1.3
Sweden	2801	37	32	5	-6.7	-12.7	1.2	-5.1
United Kingdom	2190	104	171	-67	-6.7	-4.3	1.3	-6.7
EU15	2804	1750	1837	-87	-7.3	4.9	2.1	+47.0
Cyprus	3845	0	1	-1	-8.7	0.0	0.8	-0.0
Czech Republic	2474	41	40	1	-8.7	2.8	1.0	+0.7
Estonia	1909	5	4	1	-8.7	2.3	1.1	+0.1
Hungary	2403	3	8	-5	-8.7	-0.2	1.0	-0.1
Latvia	1671	7	5	2	-8.7	0.2	1.0	-0.0
Lithuania	2232	10	6	3	-8.7	-12.7	0.9	-1.3
Malta	3149	0	0	0	-8.7	0.0	0.1	-0.0
Poland	2185	118	108	10	-8.7	3.3	1.0	+2.8
Slovac Republic	2563	9	8	2	-8.7	2.7	1.0	+0.2
Slovenia	2289	4	2	2	-8.7	6.4	1.0	+0.2
10 New MS	2249	197	182	14	-8.7	2.3	1.0	+2.6
Bulgaria	1794	3	4	-1	0.0	1.8	0.0	+0.1
Romania	1987	9	8	1	0.0	-0.9	0.0	-0.1
Bulgaria/Romania	1940	12	12	0	-0.1	-0.3	0.0	-0.0
EU27	2743	1959	2032	-73	-7.3	4.6	2.0	+49.6

butter, which would be at 2218 €/tonne (90% of official IP) for the baseline. Nonetheless, Table 19 gives market prices for Spain, UK and several NMS in 2020 of slightly less than 2200 €/tonne in the baseline which should even decline further by 7-9% as a consequence of the quota abolition. However, these baseline prices for butter are not strictly comparable since the effective intervention price holds for qualities meeting the intervention criteria whereas the national butter prices in CAPRI are mainly derived from Eurostat price time series (PRAG domain) and their exact definition is only implicit in the statistical data collection processes of each MS. Hence intervention for butter is currently not triggered if a particular national market price 'hits' the effective intervention price. It is, therefore, possible to have national prices below effective intervention prices in the model and this does not affect the correct representation of the intervention mechanism.

Instead, changes in intervention stocks *are* triggered in the EU-15 in line with developments in the difference between the EU-15 market price and the effective intervention price. This implies first that (in the current CAPRI version) intervention only responds to the EU-15 market prices (rather than national prices). Secondly it implies that the reference point for the change in intervention activity is a relative one rather than an absolute one. The relative reference point permits to accommodate differences in definitions of EU market prices and effective intervention prices. In the base period 2004 (three-year average) the EU-15 market price for butter was 2970 €/tonne whereas the effective intervention price was at 2747 €/tonne (difference = 223 €/tonne) and intervention stocks were at 190 000 tonnes. In the baseline this difference improves to 2729 – 2218 = 511 €/tonne, giving a strongly reduced intervention stock of 11000 tonnes. The price drop under abolition of quotas decreases the difference to 2559 – 2218 = 341 €/tonne which causes intervention stocks to slightly increase to 16000 tonnes. Intervention stocks would have increased stronger (in a nonlinear way) had the price change been stronger. They would approach the base year value if the simulated difference of the EU-15 market prices and the effective intervention price had been similar to the base year value (223 €/tonne).

Whereas intervention activity thus remains quite unimportant after the quota abolition, this does not apply to export subsidies for butter. Export subsidies at 376 m € in the base year, would drop to 10 m € in the baseline but increase again to 75 m € after the abolition of milk quotas, in order to limit the decline in EU butter prices. Export subsidies are represented in the model similarly than intervention stocks. Once the model is calibrated to the export subsidies observed in the base year, per unit export subsidies hence increase in the baseline if market prices increase or export unit values drop, or if the share of subsidised exports on total exports increase.

In contrast to price changes there are remarkable differences in dairy production impacts between various MS. One of the drivers for differences in the production of dairy products is of course the different production increase at the level of raw milk. Dairy outputs have to increase in such an amount that milk fat and protein balances are maintained in equilibrium. In this framework some changes in specialisation are possible and partly needed to close the (linear) balances. As can be seen in Table 19 to Table 23, price changes differ between dairy products such that dairies will try to shift the product mix. This may not be entirely surprising, given that milk fat and protein balances also reflect the differences in initial composition and some differences in contents of raw milk and dairy products across MS which renders the comparison of equilibrium outcomes across countries quite complex. Changes in dairy output quantities may differ therefore from the percentage change in raw milk processing. As an example it may be seen in Table 19 that butter production increases more in Belgium-Luxembourg than in Spain even though the increase in raw milk production is nearly the same in both countries. On the EU average butter production is increasing slightly stronger (+4.6%) than the increase in raw milk production (+4.4%)

Table 19 further indicates that butter prices are declining by about 7% in the EU-15[20] and 9% in the NMS. This stimulates some increase in demand which is typically about 1.5% in the EU-15, as demand elasticities for butter are low (around 0.3 in the EU-15 MS) and consumer prices decline by 2-3 percentage points less due to fixed margins. There are however some particular cases (especially Denmark) where non-negligible quantities of butter are reused in dairies which are assumed to respond more elastically to price changes and increase the average response in the EU-15. Production and demand changes are predicted to be smaller in the NMS, with +2.3% in the EU-12 and +1.8% in Bulgaria but -0,9% in Rumania.

20 Readers may wonder why the EU-15 average price is declining by 7.3% whereas prices in each MS of the EU-15 are only declining by 6.7%. This occurs when aggregating prices, since high production increases occur in Belgium-Luxembourg, Germany and the Netherlands, all countries with clearly below average prices in the EU-15. Their implicit weights in the EU-15 average are thus increasing which drives down the EU-15 average by more than 6.7%.

Table 20: Market results of quota abolition: SMP, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
Austria	2601	5	3	2	-6.3	8.5	5.1	+0.3
Belgium-Lux.	2733	99	58	41	-6.3	18.5	3.3	+16.3
Denmark	2376	22	11	11	-6.3	4.1	13.4	-0.6
Finland	2632	28	26	3	-6.3	-6.2	2.2	-2.3
France	2385	147	165	-18	-6.3	9.7	3.8	+7.9
Germany	2609	193	125	68	-6.3	7.8	3.0	+11.3
Greece	2588	0	2	-2	-6.3		1.6	-0.0
Ireland	2587	48	22	26	-6.3	10.8	4.7	+4.1
Italy	2376	0	102	-102	-6.3	0.0	11.2	-11.5
Netherlands	2475	50	143	-92	-6.3	6.6	5.8	-4.9
Portugal	2586	5	11	-5	-6.3	1.5	2.5	-0.2
Spain	2564	9	14	-6	-6.3	29.5	1.8	+2.3
Sweden	2584	29	30	-1	-6.3	-9.7	1.6	-3.3
United Kingdom	2697	79	87	-8	-6.3	-9.4	1.2	-8.5
EU15	2571	714	799	-85	-6.3	6.7	4.6	+11.0
Cyprus	1303	0	0	0	-3.5	0.0		+0.0
Czech Republic	2172	25	4	21	-3.5	3.7	1.0	+0.9
Estonia	1593	8	3	4	-3.5	1.9	1.1	+0.1
Hungary	2191	7	2	6	-3.5	8.8	1.0	+0.6
Latvia	2859	1	0	0	-3.5	-9.1	2.1	-0.1
Lithuania	2503	9	0	9	-3.5	-10.0	8.0	-0.9
Malta	2766	4	2	1	-3.5	0.0	2.3	-0.1
Poland	1523	148	27	121	-3.5	6.2	1.1	+8.9
Slovac Republic	2516	10	5	4	-3.5	-0.7	2.2	-0.2
Slovenia	1303	1	0	1	-3.5	18.9		+0.2
10 New MS	1719	213	44	168	-4.0	4.7	1.3	+9.5
Bulgaria	1619	4	9	-5	-3.1	2.6	2.0	-0.1
Romania	2676	1	6	-5	-3.1	-7.1	3.8	-0.3
Bulgaria/Romania	1803	5	15	-10	-3.9	0.9	2.7	-0.3
EU27	2373	932	859	74	-5.8	6.2	4.4	+20.2

Net imports of butter would strongly decrease to (-73 000 + 50 000) -23 000 tonnes in the EU-27 as a consequence of the abolition of quotas. This effect is almost exclusively originating in the EU-15 whereas net trade of EU-10 and EU-2 would be hardly affected with the exception of Poland.

Production of SMP increases by 6.2% according to the CAPRI simulations in the EU-27 which is the total from a stronger increase in the EU-15, a moderate increase in the NMS and small changes in the EU-2. In line with the stronger production increase in the EU-15 prices would decrease there by about 6% whereas prices would only decline by about 4% in the NMS. Demand is increasing moderately in response to these price changes in the EU-15, but demand would grow more sizeably in Denmark and Italy. In both countries SMP is nearly completely used in the feed sector which is furthermore more responsive to price changes than in other countries. On the EU-27 average the increase in demand (4.4%) is smaller than the increase in supply. Net exports would moderately increase therefore by about 20000 tonnes compared to the baseline (cf. Table 20).

As for the other bulk products WMP production would increase slightly more (+4.7%

Table 21: Market results of quota abolition: whole milk powder, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
Austria	2937	1	2	-1	-6.7	4.6	9.0	-0.1
Belgium-Lux.	3236	94	49	45	-6.7	2.4	2.3	+1.1
Denmark	2848	90	16	74	-6.7	3.5	2.1	+2.8
Finland	2917	2	2	0	-6.7	-3.2	1.5	-0.1
France	2869	189	48	141	-6.7	7.1	3.1	+12.0
Germany	3089	111	104	7	-6.7	8.2	2.6	+6.4
Greece	2874	0	21	-21	-6.7		2.3	-0.5
Ireland	2925	41	12	29	-6.7	13.2	1.1	+5.3
Italy	3057	0	38	-38	-6.7		2.6	-1.0
Netherlands	2895	83	23	60	-6.7	6.3	4.3	+4.2
Portugal	2866	12	10	3	-6.7	1.1	2.5	-0.1
Spain	2888	10	14	-4	-6.7	21.6	2.5	+1.8
Sweden	2842	17	21	-4	-6.7	-8.2	2.2	-1.9
United Kingdom	2880	65	84	-19	-6.7	-7.1	2.7	-6.9
EU15	2956	715	443	272	-6.7	4.9	2.7	+23.0
Cyprus	3973	0	1	-1	-5.8		5.0	-0.1
Czech Republic	2573	14	4	10	-5.8	3.1	1.4	+0.4
Estonia	1688	8	2	6	-5.8	1.3	1.4	+0.1
Hungary	2659	1	2	-1	-5.8	-4.1	1.6	-0.1
Latvia	2044	0	0	0	-5.8	0.0	1.9	-0.0
Lithuania	2347	0	1	0	-5.8	0.0	2.2	-0.0
Malta	3017	3	1	2	-5.8	0.0	1.4	-0.0
Poland	1725	40	43	-3	-5.8	6.5	1.6	+1.9
Slovac Republic	3200	6	7	-1	-5.8	-7.3	1.5	-0.5
Slovenia	2265	0	0	0	-5.8	0.0	0.0	+0.0
10 New MS	2032	72	60	11	-6.6	3.7	1.6	+1.7
Bulgaria	1897	0	3	-3	-2.3	0.0	1.6	-0.0
Romania	2772	9	10	-1	-2.3	-2.8	1.7	-0.4
Bulgaria/Romania	2771	9	13	-4	-2.3	-2.8	1.6	-0.4
EU27	2874	795	516	279	-6.7	4.7	2.5	+24.3

in the EU-27) than the increase in raw milk production (+4.4%). The total effect is the net effect of a stronger increase in the EU-15, a moderate expansion in the EU-10 and a decline in Romania. Prices are projected to decline by 6.7% in the EU-15 which is similar to the changes projected for butter and SMP. In the EU-10 they also decline by about 6% whereas the EU-2 is projected to see a more moderate price drop. Demand is increasing by 2.5% in the EU-27 as elasticities are only around 0.4 in the EU-15 MS. With production increase exceeding the growth in demand, net trade may be projected to increase giving additional net exports of 24300 tonnes according to the CAPRI simulation on the EU-27 level (cf. Table 21.

Cheese production is increasing less than the production of bulk products, i.e. only 1.3% in the EU-27 and slightly more in the EU-15. The difference to the bulk products may be explained by a greater importance of raw product costs for the former. A certain decline in the price of milk fat and protein will trigger a large increase in production if the share of milk fat and protein value in the product price is high but, for cheese a greater part of the cost is due to other costs. In spite of a small change in production, cheese

Table 22: Market results of quota abolition: cheese, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
Austria	4588	145	197	-52	-5.0	4.0	1.4	+3.1
Belgium-Lux.	3113	67	287	-220	-5.0	15.1	1.5	+5.7
Denmark	4293	355	176	179	-5.0	-4.4	0.6	-16.6
Finland	3412	125	108	17	-5.0	-2.9	1.0	-4.7
France	5001	1994	1785	209	-5.0	-8.0	1.4	-185.5
Germany	3456	2215	1837	378	-5.0	3.4	1.1	+56.4
Greece	5651	278	340	-62	-5.0	-2.6	0.8	-9.8
Ireland	5006	133	54	79	-5.0	5.7	0.5	+7.4
Italy	5249	1440	1314	126	-5.0	0.2	0.9	-8.2
Netherlands	3416	773	448	326	-5.0	26.5	1.0	+200.8
Portugal	4568	77	126	-49	-5.0	-0.8	0.9	-1.8
Spain	4567	397	513	-116	-5.0	8.6	0.9	+29.2
Sweden	4130	130	208	-79	-5.0	-7.8	0.6	-11.4
United Kingdom	4178	344	652	-308	-5.0	-7.1	1.1	-31.9
EU15	4368	8474	8046	428	-6.0	1.4	1.1	+32.7
Cyprus	6320	14	16	-2	-3.1	1.2	0.3	+0.1
Czech Republic	3829	152	165	-14	-3.1	2.5	0.4	+3.1
Estonia	3123	30	24	6	-3.1	-3.6	0.6	-1.2
Hungary	3832	81	66	14	-3.1	10.4	0.8	+7.9
Latvia	2912	50	32	18	-3.1	-2.2	0.9	-1.4
Lithuania	2476	123	48	75	-3.1	-0.1	0.5	-0.3
Malta	5042	5	11	-6	-3.1	1.2	0.4	+0.0
Poland	2725	761	589	173	-3.1	-0.2	0.8	-6.7
Slovac Republic	4459	41	39	2	-3.1	-2.6	1.1	-1.5
Slovenia	3649	28	25	2	-3.1	2.5	0.3	+0.6
10 New MS	3038	1284	1016	268	-2.8	0.6	0.7	+0.6
Bulgaria	2963	85	74	12	-1.7	0.1	0.6	-0.3
Romania	2859	54	62	-8	-1.7	1.1	0.4	+0.3
Bulgaria/Romania	2923	139	135	4	-1.7	0.5	0.5	+0.0
EU27	4176	9897	9198	700	-5.6	1.3	1.0	+33.3

prices would decline by about 5% in MS of the EU-15 and 3% in the EU-12 which stimulates a moderate increase in demand for cheese. Net exports of the EU-27 would increase by about 33000 tonnes as the small increase in demand falls short of the growth in supply (cf. Table 22).

Fresh milk products are affected in a quite similar way as cheese by the abolition of milk quotas. Production would increase modestly (+0.8 for the EU-27), whereas prices would drop more sizably (-4% in the EU-27). As demand changes are clearly smaller than the growth in supply, net imports of fresh milk products would decline (by about 25300 tonnes) (cf. Table 23).

Dairy markets are related to meat markets over several channels. In the cattle sector an expansion of the dairy herd will directly give some meat from old cows and render young animals cheaper but it also means increased competition for fodder. On the demand side substitution with dairy products, benefiting from a decline of consumer prices, may be expected to reduce demand for meats.

The net impact of increased availability of calves and reinforced competition for fodder seems to have a very small expansionary effect on supply, except for the Netherlands where it is sizeable. In Table 17 it is shown that the increase

Table 23: Market results of quota abolition: fresh milk products, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [Δ to S3]
Austria	620	966	762	204	-3.6	18.1	0.4	+171.5
Belgium-Lux.	673	1388	1002	386	-3.6	3.5	0.5	+44.1
Denmark	695	641	765	-124	-3.6	-1.7	0.4	-14.0
Finland	718	826	713	113	-3.6	-6.8	0.5	-59.5
France	821	6638	6418	220	-3.6	1.0	1.1	-3.7
Germany	621	10528	7665	2863	-3.6	5.8	0.7	+552.9
Greece	961	612	829	-217	-3.6	-2.1	0.4	-16.6
Ireland	758	569	939	-370	-3.6	7.3	0.7	+35.0
Italy	1063	2777	3661	-884	-3.6	-6.4	0.8	-207.5
Netherlands	695	1558	2167	-609	-3.6	-5.6	0.5	-97.7
Portugal	802	1014	1265	-251	-3.6	-5.4	0.6	-63.2
Spain	749	4809	5592	-782	-3.6	6.8	0.6	+292.1
Sweden	738	1284	1406	-122	-3.6	-4.0	0.4	-57.1
United Kingdom	851	6535	7660	-1125	-3.6	-7.9	0.6	-558.3
EU15	761	40143	40843	-701	-4.2	0.7	0.7	+18.0
Cyprus	845	93	104	-11	-3.8	-8.8	0.5	-8.7
Czech Republic	589	629	717	-88	-3.8	-1.9	0.6	-16.5
Estonia	517	241	179	62	-3.8	-3.2	0.7	-9.1
Hungary	577	826	793	32	-3.8	-0.4	0.7	-8.3
Latvia	451	109	92	17	-3.8	-4.2	0.7	-5.2
Lithuania	695	356	321	35	-3.8	-7.1	1.1	-29.0
Malta	524	32	38	-6	-3.8	-10.8	0.6	-3.7
Poland	313	3524	3634	-110	-3.8	4.9	0.7	+144.3
Slovac Republic	584	430	292	138	-3.8	-6.0	0.6	-27.7
Slovenia	538	363	266	97	-3.8	-7.4	0.7	-28.8
10 New MS	441	6602	6436	166	-5.1	0.8	0.7	+7.3
Bulgaria	589	161	154	7	-0.9	0.0	0.0	+0.0
Romania	637	226	233	-6	-0.9	0.1	0.1	-0.0
Bulgaria/Romania	617	387	387	0	-0.9	0.1	0.1	+0.0
EU27	715	47132	47666	-534	-4.3	0.8	0.7	+25.3

in the dairy herd in the Netherlands (+20%) is the strongest in the EU-15. At the same time the suckler cow herd would only be 7% of dairy cows in the Netherlands whereas in Austria (where the dairy herd size is increasing by 14%) there are about as many suckler cows as dairy cows such that a decline in suckler cows may compensate the expansionary effects from the dairy cow herd to a large extent. Nonetheless there would be a decline of beef prices of about 2.8% in the EU-15 MS which stimulates demand. In those NMS with a declining dairy herd, supply side effects would be negative whereas in others, most importantly Poland, there would be an increase in supply giving a total increase for the EU-10 of 0.6% (Table 17). Prices in NMS are declining similar to the EU-15. Net imports of the EU-27, dominated by the EU-15, are likely to decline to a small extent (by 27000 tonnes), as production growth would exceed the aggregate growth in demand on the EU-27 level.

Sheep and goat production is linked to the cattle sector over some competition for fodder which tends to decline production if the cattle sector is expanding. Demand is also declining due to substitution effects from beef meat as a consequence of the decline in beef prices.

Table 24: Market results of quota abolition: beef, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
Austria	3998	170	146	24	-2.8	2.1	0.5	+3.0
Belgium-Lux.	4163	246	189	57	-2.8	2.3	0.5	+4.9
Denmark	2644	107	161	-54	-2.8	1.3	0.4	+0.7
Finland	3228	64	89	-25	-2.8	-0.3	0.3	-0.5
France	4881	1466	1638	-172	-2.8	-0.3	0.2	-7.6
Germany	3069	1017	858	159	-2.8	2.8	0.3	+25.8
Greece	6323	39	182	-143	-2.8	0.4	0.8	-1.3
Ireland	3296	514	85	429	-2.8	0.7	0.6	+3.3
Italy	4592	865	1332	-467	-2.8	-0.1	0.4	-5.5
Netherlands	4711	272	379	-107	-2.8	8.9	0.4	+22.5
Portugal	4982	94	195	-101	-2.8	0.1	0.4	-0.7
Spain	4073	618	741	-122	-2.8	0.8	0.7	-0.5
Sweden	3654	120	240	-121	-2.8	-1.2	0.4	-2.4
United Kingdom	4123	725	1354	-628	-2.8	-1.0	0.8	-18.1
EU15	4128	6316	7588	-1271	-2.9	0.9	0.5	+23.6
Cyprus	3541	4	7	-3	-2.7	-0.6	0.2	-0.0
Czech Republic	2007	76	77	-1	-2.7	-0.1	0.5	-0.5
Estonia	1460	15	13	2	-2.7	0.1	0.6	-0.1
Hungary	2814	37	37	0	-2.7	3.1	1.7	+0.5
Latvia	1873	16	15	1	-2.7	0.6	0.4	+0.0
Lithuania	1687	37	37	0	-2.7	0.9	0.2	+0.3
Malta	3737	1	13	-12	-2.7	-2.3	0.2	-0.1
Poland	2166	319	269	50	-2.7	1.1	0.2	+3.0
Slovac Republic	3649	36	43	-6	-2.7	-2.4	1.4	-1.4
Slovenia	2895	50	56	-6	-2.7	-1.4	0.6	-1.0
10 New MS	2296	590	566	24	-2.9	0.6	0.5	+0.7
Bulgaria	4231	49	55	-6	-2.1	0.5	1.6	-0.6
Romania	2982	205	187	19	-2.1	2.4	0.8	+3.3
Bulgaria/Romania	3220	255	242	13	-2.1	2.0	1.0	+2.7
EU27	3945	7161	8396	-1234	-2.8	0.9	0.5	+27.0

As supply side impacts seem to be somewhat stronger, prices of sheep and goat meat may be expected to slightly increase when comparing scenario S4 with S3 (cf. Table 25).

Supply side impacts of the quota abolition are expected to be very small for pork and poultry. Substitution effects on the demand side are not much larger either. The net effect on prices is slightly negative for pork and poultry meat.

As impacts on supply and demand are very small net trade would not be affected significantly either, with net exports of pork and poultry meat each growing by some 10000 tonnes.

An expansion of the cattle sector will have an impact on fodder demand which was mentioned above as channel for interrelationships among animal activities. These impacts on fodder production are shown in Table 28.

First of all it may be seen that net trade in fodder is usually equal to zero because this is quite bulky material. The exceptions visible in Table 28 are trade of straw which is of little economic and nutritional value. Higher value fodder items include some fodder from arable land but also grass which is exogenous in total area. It may be seen that production is increasing by 1% or more in those EU-15 MS with strongly increasing milk production

Table 25: Market results of quota abolition: sheep and goat meat, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
EU15	5182	814	1441	-627	0.3	-0.8	-0.4	-0.3
10 New MS	3429	32	32	0	1.1	-1.0	-0.7	-0.1
Bulgaria/Romania	2891	171	119	53	0.3	-0.4	-0.3	-0.4
EU27	4741	1018	1592	-574	0.3	-0.8	-0.4	-0.8

Table 26: Market results of quota abolition: pork, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
EU15	1788	19642	16464	3178	-0.1	-0.2	-0.3	+9.0
10 New MS	1648	3498	3448	50	0.1	-0.3	-0.2	-1.0
Bulgaria/Romania	1446	397	831	-434	0.7	-0.6	-0.5	+1.5
EU27	1761	23538	20744	2794	-0.1	-0.2	-0.3	+9.6

Table 27: Market results of quota abolition: poultry, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
EU15	1787	11034	10445	589	-0.5	0.0	-0.1	+13.3
10 New MS	1597	2570	2186	384	-0.2	-0.3	-0.1	-5.0
Bulgaria/Romania	1422	187	659	-472	0.3	-0.6	-0.4	+1.8
EU27	1747	13791	13290	501	-0.5	-0.1	-0.2	+10.1

which drives up demand for fodder. Spain is an exception to this rule, as the whole cattle density only increases by 0.2% in this country (cf. Table 17), mainly because the important suckler cow herd declines sizeably in Spain. Conversely fodder production is stagnating or slightly declining where the cattle density would decrease sizeably (by 1 % at least, as in Finland, Greece, Portugal, Sweden, UK, the Slovak Republic, Slovenia, cf. Table 17). If the change in the cattle density resulting from the quota abolition is very small (less than 0.5%) other drivers other than fodder demand may modify the direction of change. In particular it can be seen in Table 29 that demand and prices of cereals are also increasing which compete with fodder on arable land.

Greece and Cyprus are especially interesting cases to comment on. In Greece we see the strongest decline in fodder production (-0.6%) even though the decline in the cattle density is moderate only (-1.1%) and milk production is even increasing (+0.4%). However, whereas cow milk production and fodder production declines in several regions, the dominating producer region is slightly expanding both in cow milk production and fodder production. This is, thus, an example with exceptional regional heterogeneity which may give surprising changes at the national level. Cyprus is the country with the strongest increase in fodder production but it is also the country with the lowest importance for fodder in feed ratios (5% of feed energy from fodder vs. 44% in the EU-27) and in total area use (16% vs. 45% in the EU-27). The large impact on fodder production thus has only limited importance for total agriculture in Cyprus. A more detailed analysis is given in the section on regional impacts. In line

Table 28: Market results of quota abolition: fodder, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [□ to S3]
Austria	11	49081	49081	0	0.6	0.7	0.7	
Belgium-Lux.	18	35455	35455	0	0.2	1.3	1.3	
Denmark	16	31556	24860	6696	0.3	0.5	0.5	+27.2
Finland	45	14286	14286	0	0.6	0.0	0.0	
France	13	377326	377326	0	0.1	0.1	0.1	
Germany	16	273290	273290	0	0.6	0.6	0.6	
Greece	18	18310	18310	0	0.1	-0.6	-0.6	
Ireland	5	151557	151557	0	0.6	1.1	1.1	
Italy	17	98334	98334	0	0.2	0.2	0.2	
Netherlands	11	57116	57116	0	1.1	5.5	5.5	
Portugal	8	30707	30707	0	-0.6	0.3	0.3	
Spain	4	157968	157968	0	0.5	0.1	0.1	
Sweden	15	43985	43985	0	0.4	0.1	0.1	
United Kingdom	1	349865	349865	0	0.0	-0.2	-0.2	
EU15	10	1688836	1682140	6696	0.5	0.5	0.5	+27.2
Cyprus	65	313	229	84	6.0	7.6	10.4	+0.1
Czech Republic	10	26006	26006	0	0.4	0.4	0.4	
Estonia	6	9367	8778	589	1.0	1.6	1.6	+4.9
Hungary	5	28146	28146	0	0.9	0.7	0.7	
Latvia	4	15782	14763	1019	0.8	0.4	0.4	+3.0
Lithuania	5	27287	24884	2403	0.6	1.3	1.3	+41.2
Malta	57	58	58	1	3.0	0.4	0.4	-0.0
Poland	8	97367	97367	0	0.9	0.7	0.7	
Slovac Republic	4	13982	13982	0	0.2	0.0	0.0	
Slovenia	28	6580	6421	159	0.3	0.0	0.0	+0.1
10 New MS	8	224887	220633	4255	0.8	0.7	0.7	+49.3
Bulgaria	3	28416	28416	0	1.8	0.3	0.3	
Romania	16	112497	112497	0	3.8	0.2	0.2	
Bulgaria/Romania	14	140913	140913	0	3.7	0.2	0.2	
EU27	10	2054636	2043686	10951	0.7	0.5	0.5	+76.5

with the increase in fodder, demand fodder prices are usually increasing.

If production of fodder is increasing, this will usually also involve an increase of fodder on arable land at the expense of other uses of land. Among those other uses, cereals are most frequently occupying the largest part of arable land such that indirect impacts from scarce area are best visible here. On the other hand cereals are the most important tradable feedstuff which may be expected to increase in demand if production of milk and beef is dominating the decline in pork and poultry production.

Negative impacts on cereal production through competition with arable fodder for scarce land appear to be quite small except in Belgium-Luxembourg, the Netherlands and Ireland. Demand changes are quite heterogeneous and depend on the importance of different types of animal production. On average demand is increasing slightly which tends to increase market prices (cf. Table 29)[21].

21 Note that the differences in price changes among different MS are *not* due to the specific market situation simulated for these MS. As was the case for dairy products it is assumed that prices change proportionally within trade blocks (EU-15, EU-10, EU-2). But the price change of 'cereals' in each country is the weighted average of changes for each particular cereal (soft wheat, durum, barley etc.) which would see somewhat different price changes each.

Table 29: Market results of quota abolition: cereals, 2020

	Baseline (S3)				Abolition (S4)			
	Price [€/t]	Production [1000 t]	Demand [1000 t]	Net trade [1000 t]	Price [% to S3]	Production [% to S3]	Demand [% to S3]	Net trade [Δ to S3]
Austria	107	5176	5110	50	0.3	0.1	3.3	-162.1
Belgium-Lux.	131	3054	5943	-2913	0.1	-1.2	1.1	-97.9
Denmark	124	8216	8813	-623	0.3	0.4	-0.4	+62.4
Finland	102	3958	3294	662	0.4	0.1	-1.5	+53.9
France	132	69989	33630	35979	0.2	0.1	-0.5	+236.0
Germany	123	54465	45717	8493	0.3	0.1	1.3	-540.9
Greece	192	3885	5937	-2065	0.2	1.5	-1.1	+121.1
Ireland	105	2444	3230	-799	0.3	-0.8	4.5	-165.2
Italy	171	19787	27639	-7920	0.2	0.2	-0.1	+63.0
Netherlands	136	2082	8832	-6767	0.3	-1.7	5.6	-526.6
Portugal	159	1331	4631	-3301	0.2	0.3	-0.6	+34.2
Spain	146	20890	29827	-8981	0.3	0.2	0.0	+48.1
Sweden	118	5007	4520	462	0.3	0.5	-1.1	+70.7
United Kingdom	139	26859	22604	4066	0.2	0.1	-1.6	+387.1
EU15	134	227142	209727	16342	0.3	0.1	0.3	-416.4
Cyprus	220	104	896	-793	0.4	0.1	-1.9	+17.3
Czech Republic	126	4136	4546	-414	0.2	0.3	0.3	-1.1
Estonia	92	696	671	24	0.2	0.8	-1.7	+16.7
Hungary	119	14306	10433	3872	0.2	0.1	0.3	-14.1
Latvia	99	1216	943	273	0.1	0.2	-1.0	+12.6
Lithuania	105	2894	1906	988	-0.2	1.6	0.3	+39.3
Malta	111	1	180	-180	-0.1	-0.3	-1.0	+1.8
Poland	96	31900	29842	2058	0.2	0.1	0.6	-136.5
Slovac Republic	114	3449	2648	801	0.2	0.5	-0.4	+27.7
Slovenia	123	650	887	-237	0.2	0.1	-1.0	+9.1
10 New MS	106	59351	52953	6391	0.2	0.2	0.3	-27.1
Bulgaria	101	6232	6082	150	1.4	0.3	-1.7	+122.7
Romania	154	20612	17543	3070	2.4	0.7	0.7	+25.8
Bulgaria/Romania	142	26844	23624	3220	2.1	0.6	0.1	+148.5
EU27	130	313338	286304	25953	0.4	0.2	0.3	-295.0

4.2.3 *Regional effects from a European perspective*

In this section regional differences on MS level will be investigated in more detail. Since milk quota abolition will immediately affect milk production this will be analysed first, followed by an analysis of impacts regarding the beef sector. Finally changes in the land allocation caused by adjustments in the fodder production area will be discussed.

The results presented in the following figures refer to percentage changes of regional milk production comparing the quota abolition scenario S4 against the baseline scenario S3. In order to evaluate the bandwidth of effects, the frequency of regions with dairy cow herd changes is calculated within certain clusters. Figure 12 shows that most of the European regions would expand their dairy herds as a consequence of quota abolition. Almost 70% of the regions show an increase in dairy cow herds. Strongly increasing dairy herds of more then 16% can be observed in about 10% of the regional units. Around 17% of the regional units decrease their dairy cow herds quite significantly by more than -4% in this simulation.

Figure 12: Frequency of changes in dairy cow herds

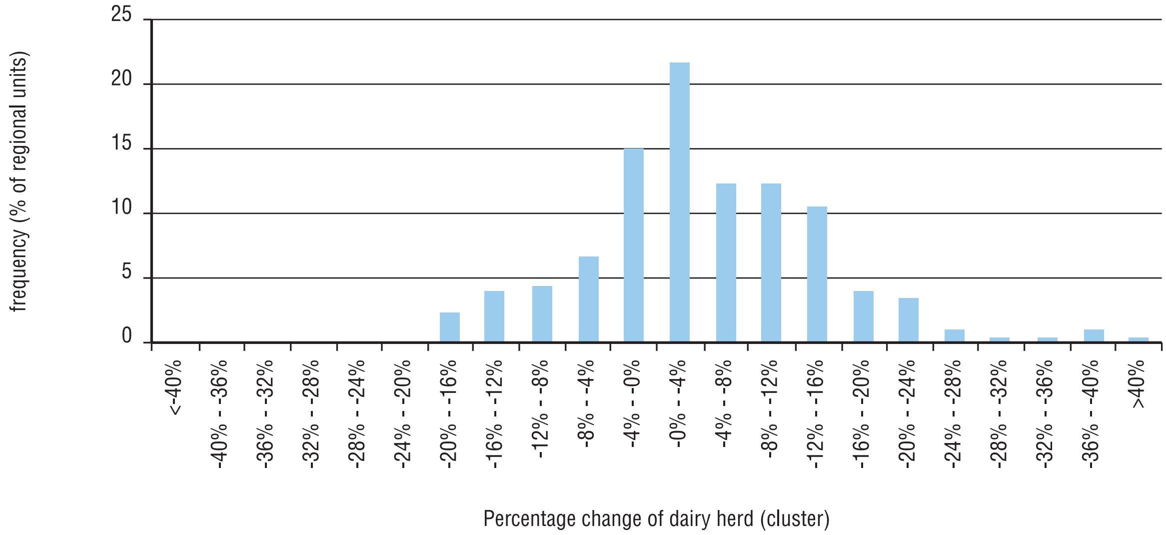


Figure 13: Percentage change of milk production in European regions

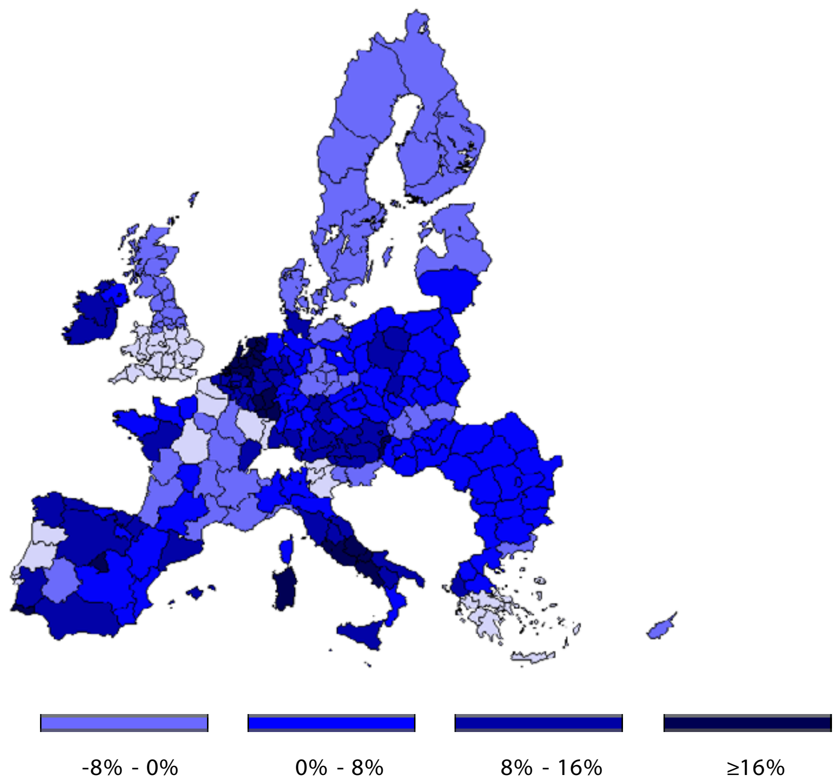
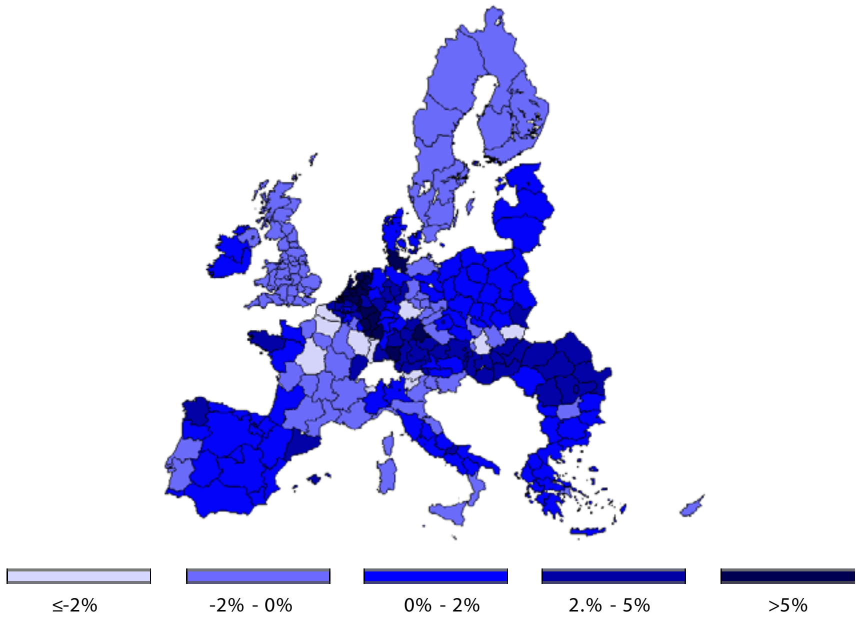


Figure 13 visualises the regional effects, i.e. the percentage change in milk production in the quota abolition scenario on a NUTS 2 level. As mentioned in earlier sections some countries like Austria, Belgium, Ireland, Netherlands and Spain increase their milk production significantly, and as can be seen in Figure 13 that overall there is little heterogeneity among their sub regions. It becomes also visible that several countries of the EU-12 would decrease

Figure 14: Percentage change in regional beef meat production (including beef from dairy cows)



their milk production slightly (compare Table 18). Again there is only moderate heterogeneity among the sub regions in the EU-12. On the other hand, in bigger MS like Germany, France and the UK there are quite significant differences within the countries. In Germany a significant reduction of milk production is expected for the eastern part, while most of the remaining regions expand their production, for most parts quite significantly. On average the German milk production moderately increases. In the UK an overall reduction of milk supply can be observed, whereas this decline is more considerable in the southern part than in the north. Finally it may be seen that the increase in the Netherlands is quite exceptional on the MS level but that some other regions are responding in a similar way.

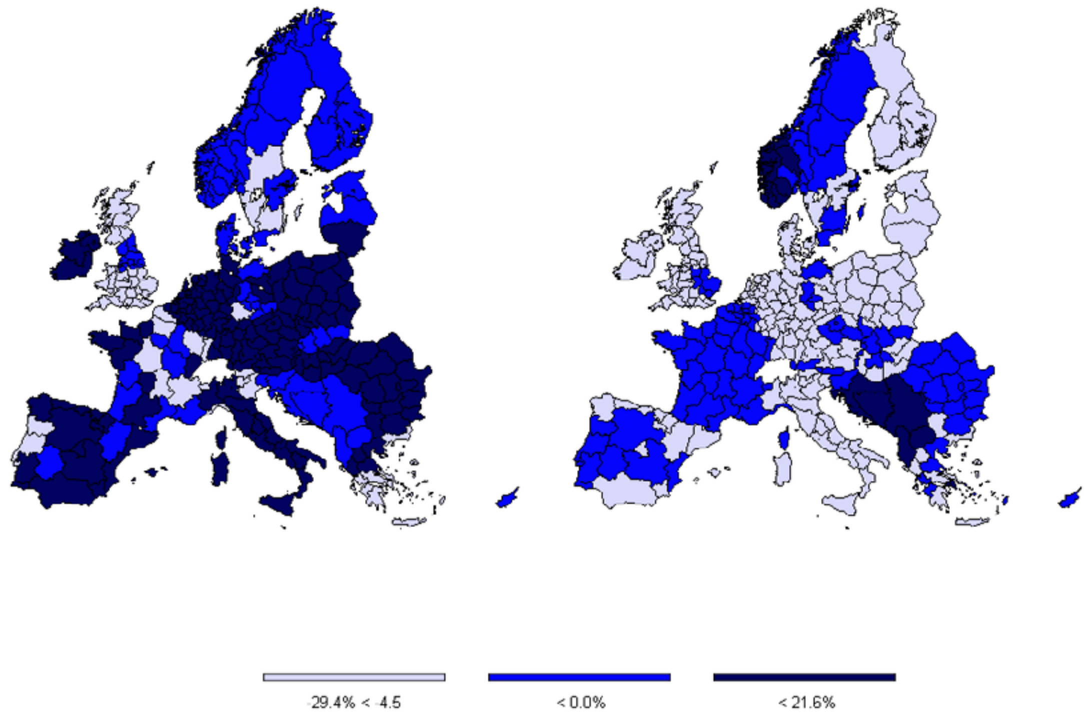
Figure 14 visualises the percentage changes in beef supply per region. It is evident that the overall change in beef production is closely correlated to the change in milk supply, although the magnitude of effects is smaller and it also depends on conditions such as the size of the suckler cow herd.

The whole cattle sector is affected by changes in dairy herds in many ways:

- Beef price: Dairy cows themselves produce beef. Hence, changes in dairy herds can directly affect the supply and price of beef.
- Supply and value of calves: Calves are "by products" of dairy production. Increasing dairy herds could lead to declining prices for calves which reduces the profitability of suckler cows but at the same time fattening activities become more profitable.
- Competition for fodder: Beef meat activities – fattening of bulls, heifers and calves as well as suckler cows – compete with dairy cows for regional feed resources. This would result in opposite effects in beef and dairy sectors. When dairy cow herds increase, the value of fodder produced in the regions increase and beef production lose in profitability. This effect is moderated when tradable feedstuff can be adopted or fodder areas can be adjusted.

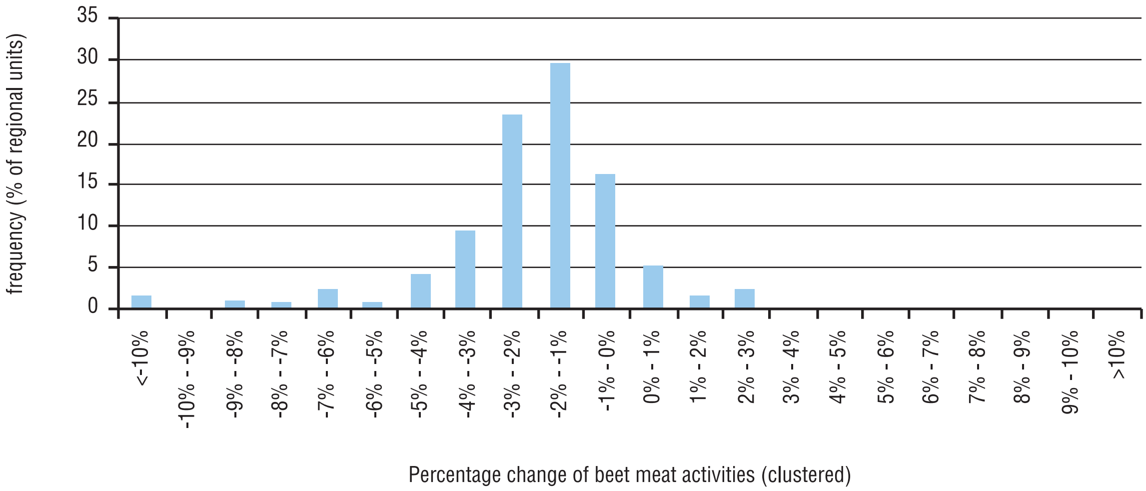
The previous considerations reveal that the interdependencies among cattle activities can lead to parallel as well as antagonistic changes in dairy

Figure 15: Development of dairy and beef meat herds



Note: the left map shows dairy cow herds (Ø change for the EU-27 +4.2%) and the right map shows suckler cows (Ø change for the EU-27 -4.4%)

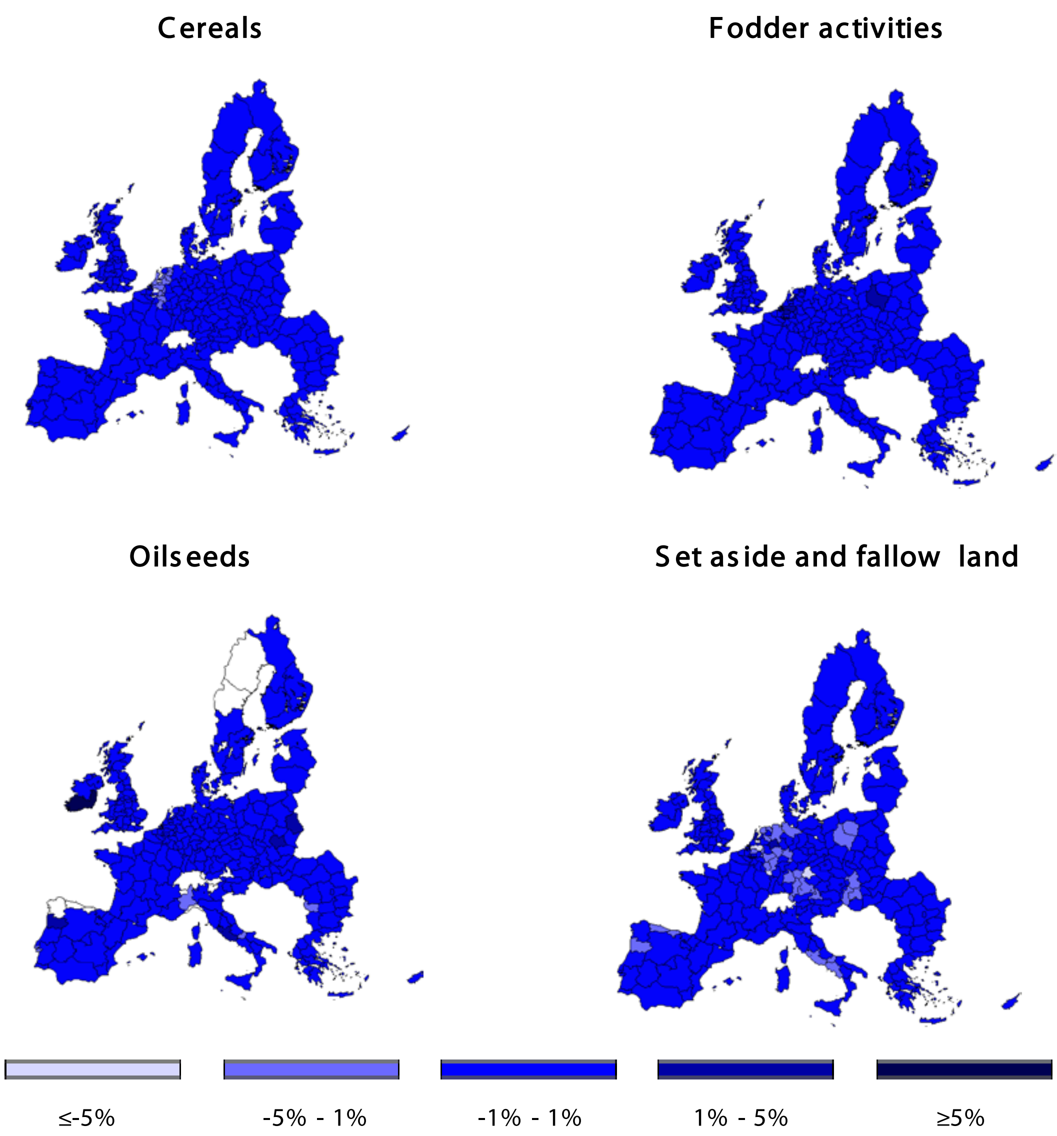
Figure 16: Frequency of changes in beef producing activities (herd size)



and beef meat activities. Looking at herd sizes of dairy and beef producing activities (see Figure 15) there appears to be a negative correlation, suggestion that competition for fodder is often the dominating relationship. Again effects on the production level of beef meat activities may be seen to be smaller compared to the dairy herds.

Calculating the frequency of regions changing their beef meat herds within a certain

Figure 17: Percentage change in area of major land use categories



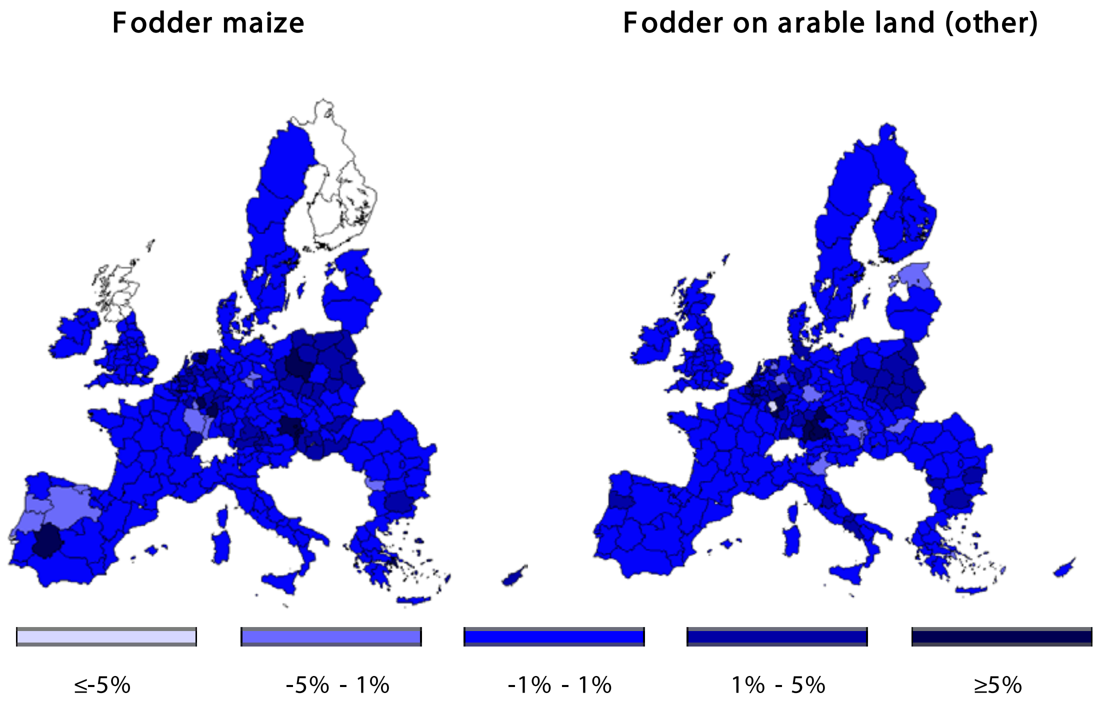
cluster reveals that in most European regions there is almost no change (cf. Figure 16)

It can be concluded from this subsection that the effects of the milk quota abolition on the beef sector are usually small. The effects are moderated by opposite changes in the suckler cow herd (pure beef meat activities) but the overall beef supply tends to increase due to the increasing number of slaughtered dairy cows and cheaper calves.

Milk quota abolition can also influence land allocation, i.e. the production level of crops on arable land, since fodder production activities compete with other crops for the fixed resource land. However the model results show almost no changes at the aggregated level of cereal and total fodder production level (cf. Figure 17)

The aggregate “fodder activities” includes permanent grassland which is fixed in CAPRI simulations. Hence changes in land allocation become visible when analysis is focused on specific production activities. Looking at percentage changes of the two most important activities ‘fodder maize’ and ‘other fodder

Figure 18: Percentage change in area of fodder maize and other fodder production activities



from arable land'[22] more sizable effects can be observed. However these effects are often antagonistic, i.e. when fodder maize increases 'other fodder' goes down and vice versa. This observation is in line with the almost unchanged aggregated fodder production level. It can be explained since fodder maize has generally higher yields than other fodder from arable land. Hence a shift from other fodder on arable land to fodder maize can increase the overall fodder supply at almost unchanged fodder area.

CAPRI simulation results reveal that the changing feed demand caused by the quota abolition is mainly influencing the intensity of fodder production activities, i.e. the intensity of a single activity and shifts among fodder activities. Hence other crop activities are almost not affected. Furthermore the model tends to adjust the feeding of tradable fodder components – mainly cereals and cakes – in order to achieve a balanced supply of nutrition for the animals in the simulation.

4.2.4 Regional effects in selected Member States

In this section a selection of six Member States (France, Germany, Spain, the United Kingdom, Poland and Romania) are analysed in their regional dimension. This selection has been done since these MS show the most regional heterogeneity in the scenario results. Further maps on the rest of countries that have been regionalised in CAPRI (14 Member States: the Netherlands, Greece, Ireland, Portugal, Belgium and Luxemburg, Italy, Austria, Sweden, Finland, Hungary, Czech Republic, Slovak Republic and Bulgaria) can be found in Annex 2.[23]

22 Mainly temporary grazing and glover

23 It is important to note, that seven Member States (Denmark, Latvia, Lithuania, Estonia, Slovenia, Malta, Cyprus) do not have a NUTS 2 division and are therefore not regionalised in CAPRI.

France

The regional effects within France are rather heterogeneous. As the regional distribution of quota rents in the baseline and percentage changes in dairy herds are almost identical it appears that the estimated quota rents are driving the impacts on dairy herds in line with Figure 11. High rents and abolition impacts seem to be related to the density of dairy cows measured in livestock units per ha. Regions increasing their milk production significantly also tend to have high animal densities. The only obvious exemption from this general observation is the region "Rhone-Alpes" in the south west. Here quite low quota rents are observed albeit the density of dairy cows is quite high. A high share of fodder production in UAA (Utilisable Agricultural Area) indicates both a high economic importance of the ruminant sector and a lack of economic alternatives. Combined with low quota rents and the assumption of uniform price changes within countries a significant drop in agricultural income in "Rhone-Alpes" may be expected. On the contrary, in the intensively dairy producing and expanding regions in the north west the drop in prices would be partially offset by an increase in milk production. The intensive arable regions in the centre of the country are almost not affected by income losses (and hence are in the group of highest or least negative income changes). This is due to the fact that the economic weight of cattle, approximated by fodder area, is low and, furthermore, cereal prices slightly increase (cf. Table 29). Looking at the large share of fodder production in Mediterranean regions (Languedoc, Provence) one might expect a high drop in income but the intensive permanent crops (e.g. vineyards) account for a large share of agricultural income although their share in area is small. Consequently income losses are negligible in these areas.

Germany

Germany is also a large European country with significant heterogeneity among regions. Again quota rents emerge as a major driving force for changes in dairy herds. The regional pattern of income effects is matching less with quota rents than in France. In general German regions are more homogeneous regarding cropping pattern and animal density than regions in France. It appears that the economic importance of the cattle sector as indicated by the fodder area share is just as important for the income effects as the initial quota rents and changes in dairy cow herds. While overall agricultural income decreases in Germany on average by -3.6%, the most benefitting regions Saarland and Trier observe income gains of up to 4.8% and 4.4%. Hence, the gains in agricultural income are found in regions with a rather tiny dairy sector. On the other hand, the most negatively affected regions Schwaben, Sachsen-Anhalt, Thueringen and Oberbayern face agricultural income losses between -6.6 and -5.5%. Thus, with Schwaben and Oberbayern two of the biggest cow milk producing regions in Germany are among the most negatively affected regions.

Spain

The estimated quota rents in Spain are more homogeneous (compared to France and Germany) than the classification of regions into 'high-medium-low' in Figure 21 (cf. Table 32). Consequently other determinants than quota rents influence regional developments of dairy herds (like regional competition for fodder) and the match of the corresponding maps for rents and dairy cow impacts is quite poor. The dairy production in Spain is concentrated in the north west where also the highest expansion in dairy herds after quota abolition is expected. The area share of fodder production and the animal density of dairy cows are closely correlated. A counter-example is "Extremadura" where 'beef cattle' is dominant. In the central and eastern regions of Spain the dairy density per ha is below average such that income losses are also quite low and these regions are in the more favourable group for the income effects.

Figure 19: Selected regional results for France

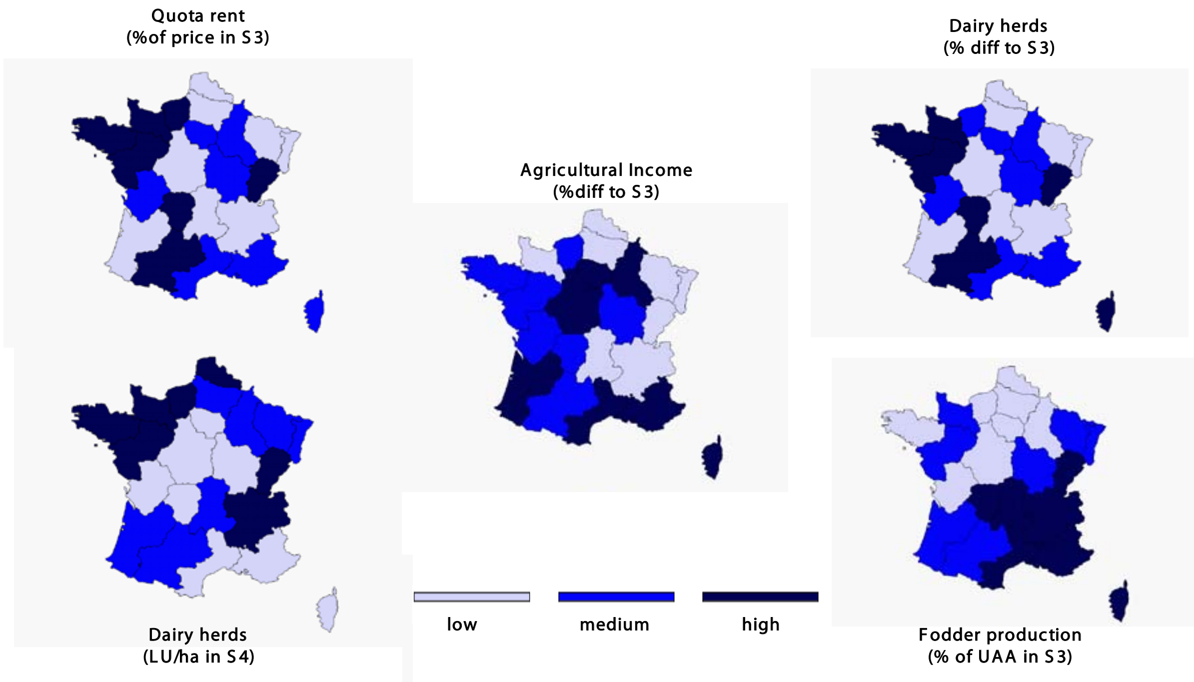


Table 30: Selected regional results for France

Region	Baseline (S3)	Abolition (S4)						
	quota rent [% from milk price]	dairy herds [1000 heads]	[% to S3]	Milk yield [kg/head]	Animal density (dairy) [LU/ha]	Fodder production [% of UAA]	Agricultural Income [Mio €]	[% to S3]
France	12.57	3463	-0.28	7243.96	0.13	49.26	36851	-2.82
Ile de france	10.80	7	-2.49	7233.48	0.01	14.07	598	-0.39
Champagne-Ardenne	12.28	100	-0.72	7510.84	0.07	36.23	1729	-1.84
Picardie	2.23	111	-11.97	7989.26	0.10	26.55	1850	-3.29
Haute-Normandie	13.25	140	0.40	6713.79	0.17	40.38	1097	-3.24
Centre	5.77	56	-8.35	6745.82	0.03	23.60	2385	-1.45
Basse-Normandie	15.70	420	4.47	7062.19	0.31	64.09	1917	-4.36
Bourgogne	10.00	62	-3.46	6102.35	0.04	58.29	1496	-1.99
Nord-Pas-De-Calais	2.27	149	-15.32	8028.05	0.20	33.30	1449	-5.79
Lorraine	1.00	141	-17.72	7701.10	0.15	53.61	1131	-7.30
Alsace	1.00	35	-16.49	7883.20	0.12	44.40	432	-4.44
Franche-Comte	20.01	194	7.99	6906.43	0.27	69.62	713	-4.58
Pays de la loire	18.89	476	8.52	8514.63	0.20	49.17	4230	-2.51
Bretagne	15.47	676	6.02	8393.70	0.36	41.13	5557	-2.25
Poitou-Charentes	10.30	101	-3.51	5002.01	0.06	26.55	2059	-2.91
Aquitaine	9.91	99	-3.81	7418.09	0.07	45.55	2218	-1.50
Midi-Pyrenees	14.55	156	1.28	5649.48	0.06	47.39	2312	-2.04
Limousin	15.17	39	1.05	4479.14	0.04	85.25	685	-1.88
Rhone-Alpes	9.51	240	-4.52	6467.78	0.17	68.38	2032	-3.72
Auvergne	9.77	229	-5.58	5422.05	0.15	79.27	1281	-5.02
Languedoc-Roussillon	12.15	24	-2.15	3137.65	0.03	71.47	886	-0.70
Provence-Alpes-Cote d'Azur	13.02	6	-2.26	2102.21	0.01	74.51	658	-0.40
Corse	12.42	0	0.41	6739.09	0.00	90.75	134	-1.36

Figure 20: Selected regional results for Germany

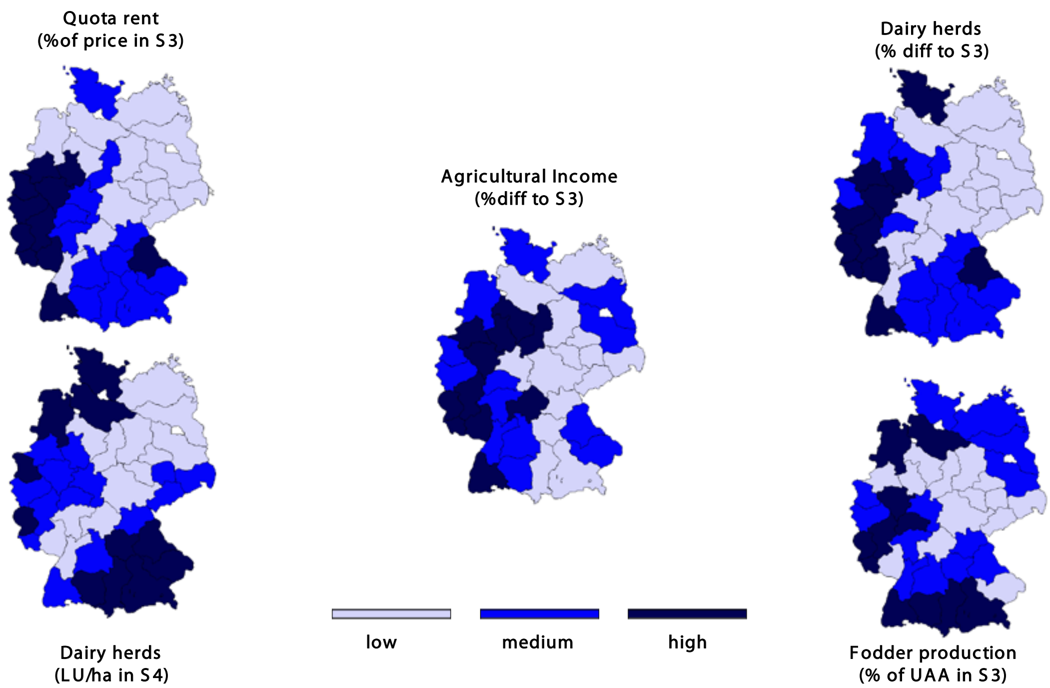


Figure 21: Selected regional results for Spain

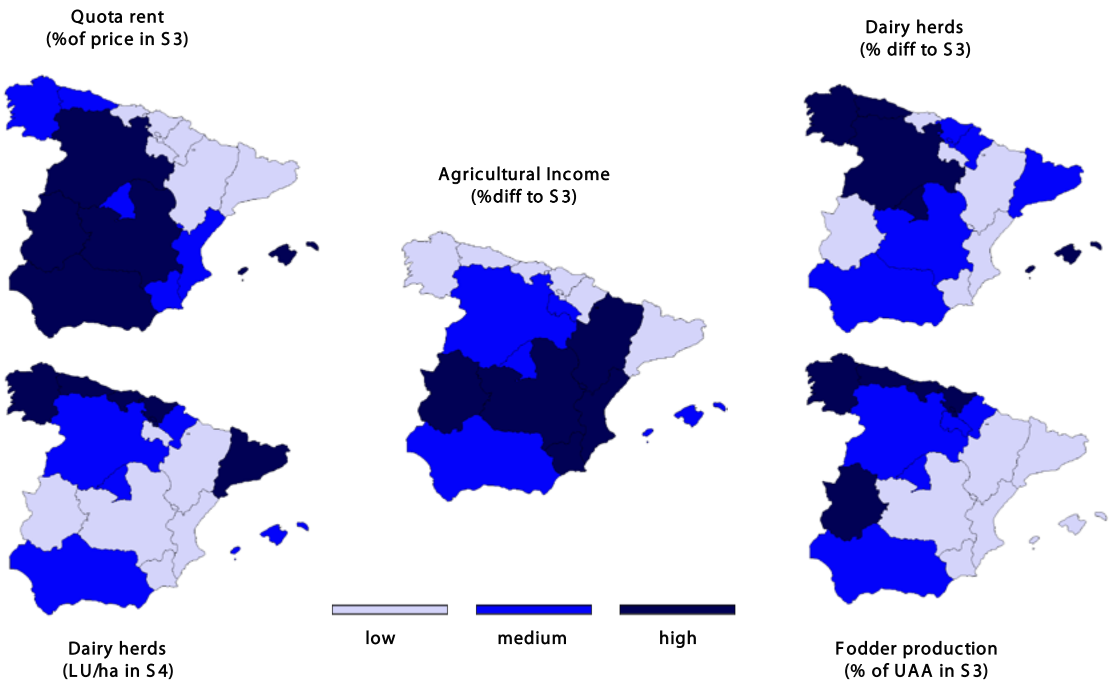


Table 31: Selected regional results for Germany

Region	Baseline (S3)	Abolition (S4)						
	quota rent [% from milk price]	dairy herds [1000 heads]	[% to S3]	Milk yield [kg/head]	Animal density (dairy) [LU/ha]	Fodder production [% of UAA]	Agricultural Income [Mio €]	[% to S3]
Germany	17.80	4155	6.89	7537.88	0.25	38.33	23134	-3.63
Stuttgart	17.47	99	5.20	7268.08	0.22	37.60	678	-3.35
Karlsruhe	15.42	25	2.65	6605.83	0.12	34.22	193	-2.72
Freiburg	22.03	74	11.96	6786.79	0.21	58.11	398	-2.04
Tuebingen	20.80	170	10.42	7292.25	0.38	50.67	699	-3.50
Oberbayern	20.22	390	8.51	6879.20	0.52	56.21	1103	-5.46
Niederbayern	17.82	166	6.78	6931.53	0.30	32.68	855	-3.74
Oberpfalz	23.28	184	12.77	6564.07	0.44	44.14	549	-3.74
Oberfranken	18.44	92	7.98	7161.77	0.30	37.52	355	-4.35
Mittelfranken	17.70	110	6.51	7345.68	0.33	43.66	455	-4.55
Unterfranken	14.37	31	1.39	7803.67	0.09	24.40	407	-1.95
Schwaben	17.97	291	6.59	7521.78	0.57	58.67	834	-6.62
Brandenburg	13.80	158	0.95	8488.36	0.13	34.35	1128	-4.21
Darmstadt	16.85	30	3.82	7289.96	0.13	39.08	243	-2.73
Giessen	16.91	38	4.47	7533.17	0.19	46.54	204	-4.10
Kassel	16.91	74	4.01	7532.81	0.23	43.24	385	-4.52
Mecklenburg-vorpommern	13.30	177	-0.40	7689.66	0.16	33.83	1205	-4.47
Braunschweig	16.81	30	5.91	7996.63	0.08	12.85	406	-1.36
Hannover	16.52	63	5.08	8305.31	0.14	19.29	711	-2.06
Lueneburg	16.37	273	3.85	7089.35	0.36	49.29	1421	-4.28
Weser-Ems	16.08	361	4.24	7727.22	0.39	45.02	2670	-3.45
Duesseldorf	20.83	93	8.26	7378.27	0.43	43.86	409	-4.10
Koeln	21.09	87	11.70	7550.49	0.28	43.15	417	-2.76
Muenster	20.99	97	11.99	7931.28	0.23	28.92	1146	-1.74
Detmold	20.97	56	12.59	8342.29	0.17	25.96	569	-1.53
Arnsberg	20.99	63	10.87	7325.07	0.25	52.58	365	-2.66
Koblenz	34.34	45	36.53	7163.05	0.13	46.04	231	1.43
Trier	33.58	95	33.15	6645.46	0.41	70.40	226	4.39
Rheinhessen-Pfalz	32.75	16	36.98	7900.30	0.05	23.88	290	0.70
Saarland	34.96	19	40.86	7018.18	0.17	61.96	69	4.79
Sachsen	12.37	171	-2.79	8766.21	0.20	32.73	1071	-6.11
Dessau	11.11	46	-4.29	7509.69	0.15	22.83	380	-4.59
Halle	11.14	46	-4.23	7524.33	0.15	22.74	384	-4.52
Magdeburg	11.14	45	-4.13	7557.87	0.15	23.24	380	-4.54
Schleswig-Holstein	18.85	342	13.86	8172.69	0.33	42.57	1483	-2.72
Thueringen	11.08	97	-6.58	8728.96	0.13	29.47	817	-5.66

Table 32: Selected regional results for Spain

Region	Baseline (S3)	Abolition (S4)						
	quota rent [% from milk price]	dairy herds [1000 heads]	[% to S3]	Milk yield [kg/head]	Animal density (dairy) [LU/ha]	Fodder production [% of UAA]	Agricultural Income [Mio €]	[% to S3]
Spain	22.26	1035	11.12	7047.55	0.03	40.38	41700	-0.92
Galicia	23.25	409	13.30	7497.32	0.34	83.23	1601	-5.30
Asturias	23.42	100	15.88	9039.71	0.21	92.51	480	-4.32
Cantabria	16.91	111	2.08	5735.77	0.36	94.33	307	-8.47
Pais vasco	18.25	31	10.67	8579.14	0.09	73.60	337	-3.14
Navarra	19.13	22	10.53	7741.01	0.03	54.86	807	-1.38
Rioja	19.38	3	4.26	4000.72	0.01	54.86	379	-0.42
Aragon	18.64	9	-0.09	2823.01	0.00	32.42	3410	-0.32
Communidad de Madrid	24.38	8	18.59	11601.73	0.02	49.75	494	-0.74
Castilla-Leon	24.63	129	15.89	7034.47	0.02	44.40	6386	-0.93
Castilla-la Mancha	24.53	27	6.38	2620.46	0.00	29.75	6507	-0.40
Extremadura	25.30	10	-1.95	885.97	0.00	58.09	2892	-0.41
Cataluna	18.67	76	9.05	8257.81	0.05	32.97	2952	-1.09
Comunidad Valenciana	22.07	6	4.07	4097.97	0.01	7.40	2419	-0.24
Baleares	25.53	10	15.35	8379.64	0.03	7.68	731	-0.60
Andalucia	25.51	69	10.35	6014.44	0.01	33.46	9915	-0.59
Murcia	22.07	7	3.78	2863.16	0.01	7.61	1717	-0.26
Canarias	9.29	8	-6.78	2043.79	0.11	54.99	366	-1.18

United Kingdom

Quota rents in the UK are rather low compared to other countries. However, there are regional differences which drive mainly the overall UK changes in dairy herds after abolition of the milk quota. Similar to Germany conditions for dairy farming are fairly homogenous in the UK. A particularity in the UK is that the highest quota rents are estimated in the northern regions, where the density of dairy cows is low (except Northern Ireland), i.e. the extensive regions appear to be more competitive than the intensive regions in the south. South western regions would face a sharper decline in agricultural income than other regions since dairy production is an important sector but not competitive on the EU level. As a consequence both a drop in prices and in production contribute to income losses. Income effects in the south east are more moderate since dairy production is of relatively low importance compared to other agricultural sectors.

Poland

Highest quota rents are reported for regions in the south west and central Poland which also increase significantly their milk production (by around 10%) after quota abolition. The differences between the other regions regarding quota rent and changes in milk production (+3-4%) are almost negligible. Milk and fodder production is important in regions in the eastern part, where the density of dairy cows and the share of fodder production in total area use are quite high compared to the rest of the country. However the increase in milk production is low in the east and cannot compensate for the decline in milk prices. Consequently those regions would see a loss in income from 3% to 5%. On the other hand the income loss is almost zero in more competitive regions where milk production is increasing and in regions with a low importance of milk production.

Figure 22: Selected regional results for the United Kingdom

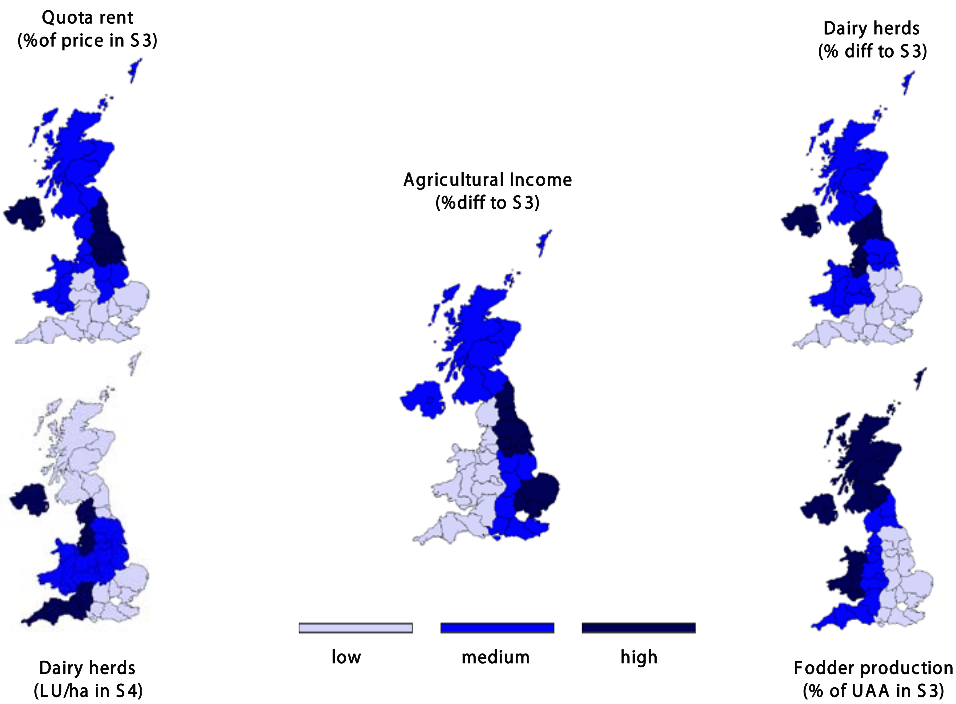
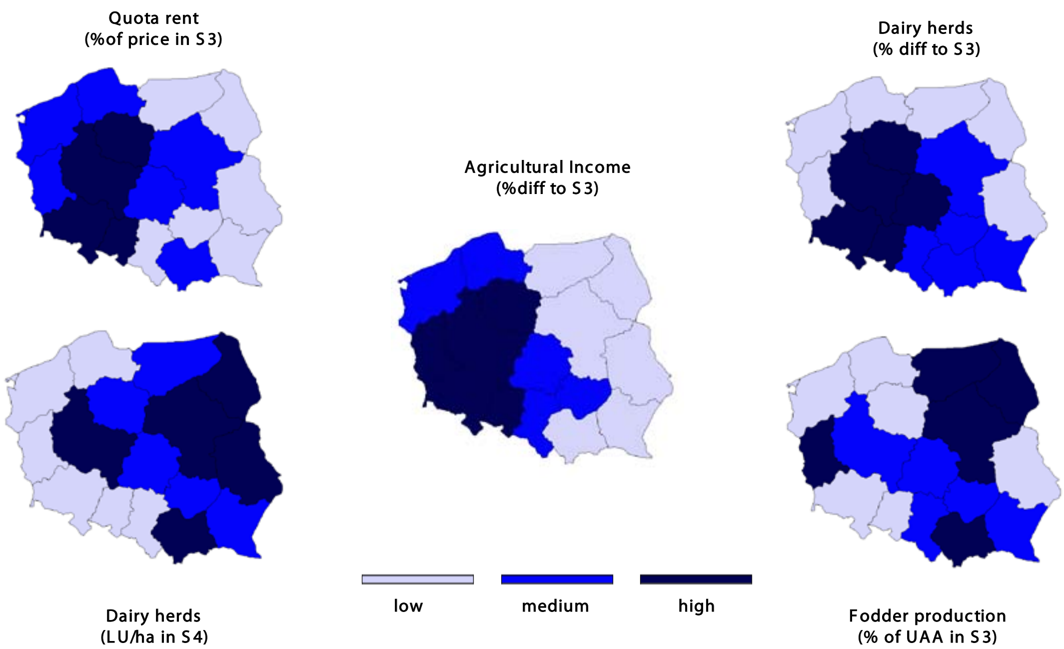


Table 33: Selected regional results for the United Kingdom

Region	Baseline (S3) quota rent [% from milk price]	Abolition (S4) dairy herds [1000 heads]	dairy herds [% to S3]	Milk yield [kg/head]	Animal density (dairy) [LU/ha]	Fodder production [% of UAA]	Agricultural Income [Mio €]	Agricultural Income [% to S3]
United Kingdom	3.17	1774	-5.77	8000.96	0.12	72.39	13226	-2.64
North East	5.05	16	-1.77	9006.44	0.03	72.97	298	-0.38
North West	5.05	270	-2.52	7788.05	0.32	86.76	779	-4.45
Yorkshire and The Humber	5.06	90	-2.70	8473.87	0.08	47.63	1315	-1.41
East Midlands	2.26	80	-9.97	8463.27	0.08	45.32	1199	-2.02
West Midlands	1.00	159	-8.39	8249.39	0.20	60.93	1231	-3.14
Eastern	1.00	28	-10.65	7080.41	0.02	28.86	1193	-0.56
South East	0.99	74	-12.70	8538.53	0.09	54.84	899	-2.56
South West	0.99	379	-9.11	8351.92	0.24	70.03	1981	-4.33
Wales	1.69	228	-8.24	7670.22	0.19	94.12	1018	-3.84
Scotland	3.96	162	-4.46	8294.01	0.03	88.81	2037	-2.01
Northern Ireland	7.72	289	1.60	7244.79	0.28	93.10	1277	-2.67

Figure 23: Selected regional results for Poland



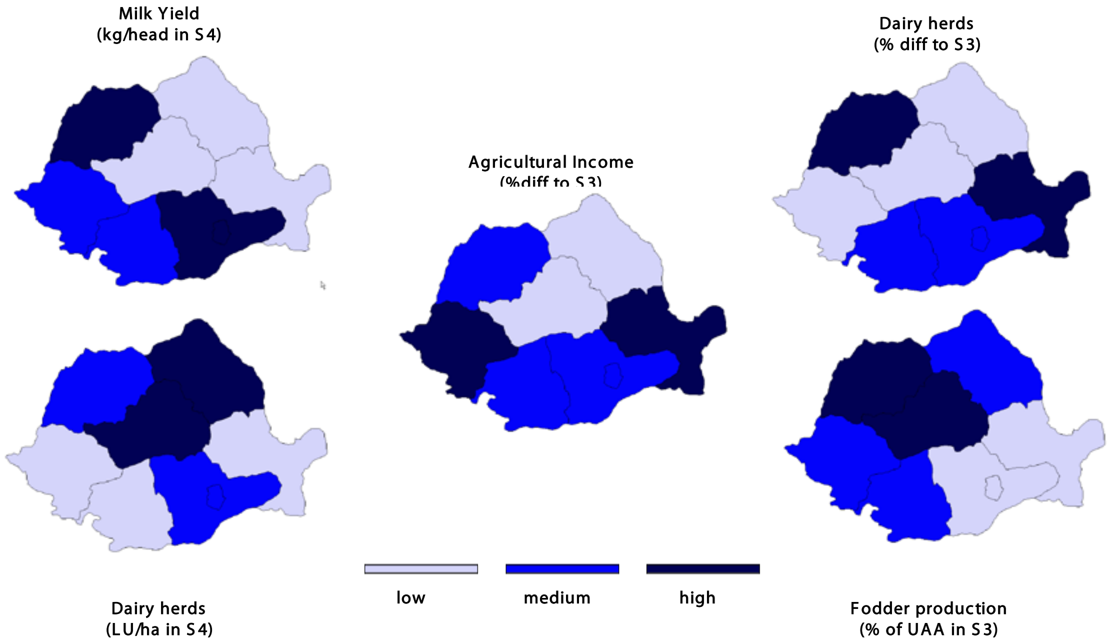
Romania

Due to lack of data for Romania it was not possible to estimate regional quota rents in the base year. However the development of positive rents according to Réquillart *et al.* (2008) suggests that Romania, as a whole, would have quota rents around 14% of milk price in 2020. This was translated into uniform assumptions for quota rents, except for numerical deviations in the calibration process (cf. table 35). Nonetheless model results for Romania show some differences in changes of dairy herds which are a result of other determinants like milk yield or fodder availability. The strongest drop in income is evident in central and north eastern regions. These regions are also characterised by low milk yields and high numbers of dairy cows per ha. The latter points both to a high importance of

Table 34: Selected regional results for Poland

Region	Baseline (S3)	Abolition (S4)						
	quota rent [% from milk price]	dairy herds [1000 heads]	[% to S3]	Milk yield [kg/head]	Animal density (dairy) [LU/ha]	Fodder production [% of UAA]	Agricultural Income [Mio €]	[% to S3]
Poland	14.60	2122	4.53	5577.42	0.13	22.75	10544	-2.04
Lódzkie	12.88	161	4.38	6133.02	0.14	20.23	862	-2.06
Mazowieckie	12.88	408	3.87	5277.92	0.17	27.44	1558	-2.55
Malopolskie	12.88	113	3.01	4839.87	0.16	34.92	359	-3.00
Slaskie	12.88	42	3.73	6698.78	0.09	21.73	293	-1.88
Lubelskie	12.88	212	2.08	4850.75	0.17	17.87	825	-2.59
Podkarpackie	12.87	86	3.82	5341.65	0.11	22.07	289	-3.11
Swietokrzyskie	12.88	72	4.22	5593.43	0.11	20.31	398	-1.82
Podlaskie	12.88	342	2.64	4795.32	0.29	43.97	615	-4.83
Wielkopolskie	21.51	246	10.59	6125.17	0.14	22.21	1834	-0.98
Zachodniopomorskie	12.99	35	1.77	6371.09	0.03	14.98	469	-1.71
Lubuskie	12.88	17	3.01	7201.97	0.03	22.79	231	-1.11
Dolnoslaskie	15.27	35	6.90	6676.12	0.03	12.51	505	-0.76
Opolskie	16.62	36	9.55	8051.48	0.06	10.01	411	-0.96
Kujawsko-Pomorskie	21.42	134	9.27	5903.95	0.14	15.52	863	-1.32
Warminsko-Mazurskie	12.87	134	2.49	6561.42	0.11	27.75	543	-3.19
Pomorskie	12.88	50	2.80	6324.70	0.06	17.03	489	-1.66

Figure 24: Selected regional results for Romania



milk production. Regions in the south, where fodder production and dairy cows are of relatively low importance, would even see some gains in income (table 35). Note that the ordering of regions into the low – medium – high classes does not express that the size of regional differences is far lower in Romania than in the other large countries selected for a more detailed exposition of results.

Table 35: Selected regional results for Romania

Region	Baseline (S3)	Abolition (S4)						
	quota rent	dairy herds		Milk yield	Animal density (dairy)	Fodder production	Agricultural Income	
	[% from milk price]	[1000 heads]	[% to S3]	[kg/head]	[LU/ha]	[% of UAA]	[Mio €]	[% to S3]
Romania	13.77	1328	3.04	3623.16	0.09	39.22	7165	0.03
Nord-Est	13.58	338	2.36	3480.09	0.16	39.24	1177	-0.22
Sud-Est	14.68	145	3.74	3500.77	0.06	24.23	1068	0.52
Sud	13.89	214	2.74	3767.46	0.10	23.43	1175	-0.17
Sud-Vest	13.65	116	3.44	3714.13	0.07	28.87	872	0.24
Vest	13.60	113	2.34	3529.18	0.06	44.18	860	0.29
Nord-Vest	13.64	182	5.13	4009.70	0.08	54.67	1129	0.15
Centru	13.60	212	2.35	3469.17	0.11	64.94	816	-0.64
Bucuresti	13.66	9	3.43	3559.94	0.07	10.51	66	-0.19

4.2.5 Income and welfare effects

The regional income effects follow from price and quantity impacts on the input and output side. The bottom line in terms of agricultural income is crucially determined by the impacts on revenues from raw milk and meats and related impacts on non fodder items. Fodder items are important for a detailed analysis but revenue and cost of fodder tend to cancel each other, so that the overall change is negligible.

The overall loss of agricultural income due to milk quota abolition is projected to be almost 4.7 billion € or 2.0%. Income changes may be attributed to a large extent to the components indicated in the table (i.e. changes in income from cow milk and meat and non fodder feed costs). In some MS, such as the Netherlands, there is a higher use of non-feed inputs, related to a high intensity of production, which are also increasing if production is expanding as projected. Hence, in contrast to many other MS, for the Netherlands the three components selected only explain a smaller part of the overall income effect. In general, the biggest losses in agricultural income are projected for countries in northern Europe, which reflects the situation that in northern Europe the share of milk production in total production tends to be higher than in Mediterranean countries. The largest decreases in agricultural income are projected for Sweden (-5.2%) Finland and Ireland (both -4,5%), Lithuania (-3.8%) and Germany (-3,6%).

A full welfare analysis of the quota abolition for the year 2020 can be drawn by adding the income effects on dairies and other producers, on the EU budget and on consumer welfare. Because market intervention in the current specification of CAPRI occurs at the aggregate EU-15 level, a complete welfare analysis is also only appropriate for the aggregates within the EU-27 (Table 37).

Whereas agricultural income would decline, the dairy industry would benefit in the EU-27, as prices of dairy products are expected to decline somewhat less than raw milk prices (cf. table 18 to table 23). However in the EU-2, with very moderately declining raw milk prices of on average 2.3% (cf. Table 18), the dairy industry would see declining profits given that market prices of derived products would come under pressure from additional supply. FEOGA impacts are mainly additional export subsidies for butter (+48 m €) plus some changes in export subsidies and premiums elsewhere. Increasing net exports usually imply a decline of imports and thus moderate losses of tariff revenues. The main beneficiaries are consumers who would benefit from various declining prices, the largest effect coming from cheese. Overall the welfare analysis gives a small overall gain to the EU-27 with losses for the EU-10 and the EU-2. The differences between the EU aggregates are mainly due to a different ratio of agricultural income relative to food expenditure, as this ratio is clearly

Table 36: Income effects of quota abolition in agriculture, 2020

	Baseline				Quota abolition (Δ to baseline)			
	agricultural income	from cow milk	from meat	non fodder feed cost	agricultural income	from cow milk	from meat	non fodder feed cost
Austria	3752	899	1884	737	-78	-5	-11	45
Belgium-Lux.	4463	987	3636	1714	-127.0	-37.7	-16.8	41.4
Denmark	4492	1569	3974	2312	-152.7	-130.7	-15.2	5.9
Finland	1543	955	828	586	-69.0	-69.5	-9.5	-9.8
France	37921	7548	16868	8509	-1070.0	-803.3	-255.1	-76.9
Germany	24004	9170	13788	6981	-870.2	-530.0	-42.9	227.4
Greece	11175	278	1440	1089	-130.0	-25.3	-17.1	-14.8
Ireland	3483	1526	2600	1076	-157.3	-22.9	-40.3	54.8
Italy	38678	4191	10594	6072	-538.9	-317.5	-136.5	10.7
Netherlands	12565	3955	4974	3012	-107.2	207.0	67.8	203.1
Portugal	3843	688	1726	1397	-71.0	-57.7	-19.9	-15.4
Spain	42087	2008	12706	7310	-386.3	-52.9	-105.7	50.1
Sweden	2114	1132	1103	380	-109.7	-105.7	-21.2	-8.1
United Kingdom	13585	4182	9032	4545	-358.3	-422.3	-160.0	-140.6
EU15	203705	39087	85152	45720	-4225.4	-2373.6	-783.7	372.4
Cyprus	459	69	267	194	-10.5	-3.3	-3.2	-1.7
Czech Republic	2201	766	1067	741	-56.4	-37.1	-7.0	10.3
Estonia	318	164	163	127	-10.6	-10.0	-1.1	-2.9
Hungary	4044	508	2065	1388	-40.1	-14.5	-9.0	19.4
Latvia	344	162	128	96	-12.3	-9.6	-0.8	-1.1
Lithuania	945	348	405	231	-36.2	-22.7	-1.4	0.1
Malta	56	16	41	48	-1.3	-0.4	-1.0	-0.3
Poland	10765	2409	6246	3254	-220.8	-122.7	-23.7	66.3
Slovac Republic	887	287	627	367	-24.9	-21.0	-7.7	-1.1
Slovenia	564	175	326	172	-16.3	-12.6	-6.8	-1.6
10 New MS	20584	4903	11334	6618	-429.4	-253.9	-61.7	87.5
Bulgaria	1949	295	609	313	-16.6	-1.6	-4.5	8.8
Romania	7163	809	1558	1294	1.8	11.1	-4.0	60.6
Bulgaria/Romania	9112	1103	2167	1607	-14.8	9.5	-8.5	69.4
EU27	233400	45094	98653	53945	-4669.6	-2618.0	-853.8	529.3

Note: income is expressed in this table in million Euro

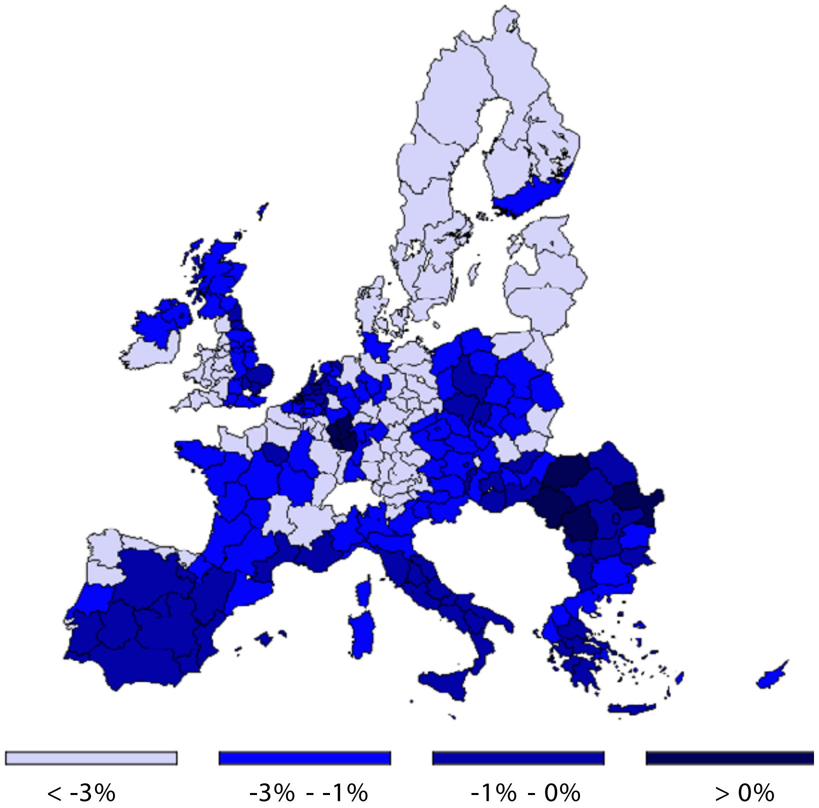
Table 37: Welfare effects of a quota abolition in the EU-15, EU-10 and EU-2, 2020

	Agriculture	Processing industry	FEOGA	Tariffs	Consumers	Welfare
EU15	-4225.4	249.6	62.4	-23.4	4300.0	238.4
10 New MS	-429.3	32.0	0.0	-0.3	335.6	-62.1
Bulgaria/Romania	-14.8	-3.5	0.0	0.1	14.3	-4.0
EU27	-4669.6	278.1	62.4	-23.6	4650.0	172.5

Note: figures are in million Euro

increasing from the EU-15 (22%) to the EU-10 (28%) and the EU-2 (39%). A similar increase may be observed for the ratio of agricultural revenue from milk to consumer expenditure for dairy products. This observation means that the loss in agricultural income (about 2% both in the EU-15 and in the EU-10) weights more heavily in the NMS than in the EU-15 such that the welfare gains are dominating in the EU-15 but not in the EU-10 and EU-2.

Figure 25: Percentage change in agricultural income after the abolition of the milk quota regime



The regional distribution of percentage changes in agricultural income after milk quota abolition is shown in Figure 25.

Regional percentage effects on agricultural incomes may be seen to be distributed heterogeneously within countries. Mostly those regions that show high quota rents in the baseline see a rather favourable income development (but there are exceptions, as e.g. regions in the Netherlands and Austria also have to cope with small income losses). Agricultural incomes are most heterogeneously affected in Germany, Portugal and Spain. For example in Germany, where overall agricultural income decreases by 3.6%, the most benefitting regions, Saarland and Trier observe income gains of up to 4.8% and 4.4%, while the most negatively affected regions Schwaben, Sachsen-Anhalt, Thueringen and Oberbayern, face agricultural income losses between -6.6% and -5.5%. Fairly homogeneous income impacts are expected in Finland, Sweden and in particular Hungary, where income losses are in the small range of -0.7 to -1.2%. Evidently the projected losses would be more serious if income of specialised dairy farmers would be considered.

5. Conclusions

The dairy sector makes a substantial contribution to the agricultural turn-over in many EU Member States (MS) as well as in the EU in aggregate. Nevertheless, within the EU-27, the size and agricultural importance of the dairy sector varies considerably between MS and across regions, basically reflecting climatic and other agricultural factors in the region concerned. The Common Market Organisation (CMO) for milk and milk products helped to create stable market conditions for EU dairy producers, but the EU's dairy policy has been continuously updated and is increasingly targeted at encouraging producers to be more market-oriented. With the Luxembourg Agreement on the Mid-Term-Review (MTR) the spotlight shifted especially on the EU's milk quota regime, because the MTR stipulated that the milk quota system, originally introduced in 1984, will come to an end in 2015. In this context it is especially important to clarify, which effects can be expected of an abolition of the milk quota regime.

For this report a significant amount of work of the CAPRI consortium has been devoted to a rigorous update of the CAPRI model. The profound update of the CAPRI model provides the basis for a comprehensive quantitative assessment of possible implications of a dairy policy reform, with an explicit focus on regional effects in the EU-27 of a milk quota abolition in year 2015.

As an explicit focus of this report is on the regional effects in the EU-27 of a milk quota abolition in year 2015, conclusions can predominantly be drawn by comparing the results of scenario S4 (year 2020 following quota abolition) and scenario S3 (2020 with quotas in place). Results of scenario S4 indicate, that by 2020 abolition of the milk quota regime provokes milk production increases by about 4.4% in the EU-27, and EU raw milk prices decline by 10%. Production of butter, skimmed and whole milk powder would increase by 5-6% while their prices would decline by about 6-7%. The production of cheese and fresh milk products would increase by about 1% and their prices could decline by 4-6%.

Scenario results indicate, that the projected impacts of milk quota abolition on regional milk production are mainly determined by the estimated milk quota rents in the baseline scenario. Hence, regions with high quota rents, such as in Austria (all above 28%), Netherlands (all above 27%), Belgium (Brabant Wallon 38%, the rest of regions above 28%), Luxembourg (29%), and to a lesser extent Italy (Lazio, Molise and Abruzzo above 33%) and Germany (Saarland, Koblenz and Rheinhessen-Pfalz above 32%), display a significant increase in milk production. The overall increase in milk production drives down dairy prices in the EU-27 and thus exerts economic pressure particularly on those regions with low quota rents (especially to be found in the United Kingdom, Sweden and Finland) to partially retreat from the market.

Highly competitive regions tend to expand their milk production and thus may be able to increase their revenues. Less competitive regions will loose revenues both from price and quantity sides. Incomes within EU MS are most heterogeneously affected in Germany, Portugal and Spain. In Germany income gains up to 4.8% are observed in benefiting regions, with income losses of up to -6.6% in most negatively affected regions. Fairly homogeneous income impacts are expected in Finland, Sweden and in particular Hungary, where income losses are in the small range of -0.7 to -1.2%.

Overall welfare effects are slightly positive for the EU-27. Whereas agricultural income would decline due to lower milk prices on average, the EU dairy industry would benefit as prices of dairy products are expected to decline less than raw milk prices (i.e. input costs decreasing more than revenues). Impacts on the FEOGA budget would arise mainly from additional export subsidies for butter and moderate losses of tariff revenues. If a full transmission of lower agricultural raw milk prices along the downward supply chain to consumers is assumed, the main beneficiaries of milk quota abolition would be consumers, who benefit from various declining consumer prices, most notably declining prices for cheese.

It is important to take into account in this analysis some limitations of the CAPRI model as well as with regard to some assumptions:

The current analysis allows for a partially endogenous representation of regional cost structures for dairy producers. Nevertheless, it is important to remark that the cost estimation framework for milk producers applied to this study has been done separately from the simulation analysis with CAPRI, so that no exchange of information between both models has been attempted (due to the short-time frame of the study and its methodological complexity). Further on, there are some limitations inherent to the CAPRI model, for instance markets for primary factors (labour and capital) are not represented, there is limited endogenous adjustments in technology and it only focuses on agriculture, with a limited representation of processing activities (dairies and oils).

Although the results of scenario S4 presented are in line with results of other studies, the simulations are based on model parameters that might be biased. The sensitivity analysis presented in Annex 3.3 reveals that the higher the assumed elasticity of milk supply, the wider is the variety of regional effects. While high supply elasticities tend to make the gap between winning and loosing regions broader, lower supply elasticities produce uniform changes among regions. With regard to quota rents, it has to be stressed that an assumption of different quota rents would have significant effects on the results of milk production as well as on milk prices and agricultural income.

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Annexes

Annex 1: Regional quota rents

Table 38: Quota rents and milk prices at regional level [2004-2020]

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Belgium and Lux.	285	80	28	256	72	28	285	79	28
Danmark	304	38	13	308	39	13	333	31	9
Germany	289	46	16	281	46	16	313	56	18
Austria	287	86	30	252	76	30	282	84	30
Netherlands	307	101	33	319	105	33	354	98	28
France	295	49	17	274	47	17	300	38	13
Portugal	275	46	18	298	52	17	335	35	10
Spain	302	84	28	276	77	28	306	68	22
Greece	368	133	35	325	114	35	358	42	12
Italy	365	73	20	340	68	20	369	52	14
Ireland	261	64	25	260	64	25	284	59	21
Finland	329	7	2	342	7	2	379	13	3
Sweden	328	14	4	312	13	4	341	10	3
United Kingdom	263	10	4	254	10	4	278	9	3
Czech Republic	279	3	1	243	3	1	282	27	10
Estonia	239	3	1	201	3	1	245	15	6
Hungary	259	4	1	254	3	1	270	34	13
Lithuania	180	9	5	152	8	5	183	18	10
Latvia	213	5	2	157	3	2	196	14	7
Poland	200	5	3	175	5	3	213	31	15
Slovenia	250	8	3	235	8	3	259	21	8
Slovak Republic	244	3	1	243	3	1	277	17	6
Cyprus			1	387	4	1	461	27	6
Malta			1	335	3	1	365	21	6
Bulgaria				194			234	21	9
Romania				187			173	24	14
Antwerpen	279	76	27	256	69	27	285	75	26
Limburg (B)	280	74	26	256	67	26	285	73	26
Oost-Vlaanderen	284	81	28	256	72	28	285	79	28
Vlaams Brabant	277	73	26	256	68	26	285	73	26
West-Vlaanderen	283	83	29	256	74	29	285	81	28
Brabant Wallon	281	88	31	256	65	26	285	109	38

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Hainaut	285	83	29	256	75	29	285	81	28
Liege	287	84	29	256	75	29	285	81	29
Luxembourg (B)	286	87	30	256	78	30	285	85	30
Namur	285	85	30	256	77	30	285	83	29
Luxembourg (Grand-Duche)	304	68	22	256	57	22	285	62	22
Stuttgart	295	46	16	281	45	16	313	55	17
Karlsruhe	294	40	14	281	39	14	313	48	15
Freiburg	295	60	20	281	58	21	313	69	22
Tuebingen	294	56	19	281	54	19	313	65	21
Oberbayern	299	55	18	281	53	19	313	63	20
Niederbayern	298	48	16	281	46	16	313	56	18
Oberpfalz	299	64	22	281	61	22	313	73	23
Oberfranken	299	50	17	281	47	17	313	58	18
Mittelfranken	298	47	16	281	42	15	313	55	18
Unterfranken	298	38	13	281	36	13	313	45	14
Schwaben	298	48	16	281	46	16	313	56	18
Brandenburg	283	34	12	281	34	12	313	43	14
Darmstadt	285	43	15	281	44	16	313	53	17
Giessen	287	43	15	281	45	16	313	53	17
Kassel	287	43	15	281	43	15	313	53	17
Mecklenburgvorp.	283	33	12	281	33	12	313	42	13
Braunschweig	281	42	15	281	43	15	313	53	17
Hannover	282	42	15	281	43	15	313	52	17
Lueneburg	283	41	15	281	43	15	313	51	16
Weser-Ems	283	40	14	281	43	15	313	50	16
Duesseldorf	288	55	19	281	59	21	313	65	21
Koeln	290	56	19	281	55	20	313	66	21
Muenster	289	56	19	281	57	20	313	66	21
Detmold	289	55	19	281	56	20	313	66	21
Arnsberg	289	56	19	281	55	19	313	66	21
Koblenz	296	96	33	281	92	33	313	107	34
Trier	296	94	32	281	90	32	313	105	34
Rheinhessen-Pfalz	296	92	31	281	88	31	313	103	33
Saarland	296	98	33	281	93	33	313	109	35
Sachsen	284	30	11	281	30	11	313	39	12
Dessau	285	27	9	281	36	13	313	35	11
Halle	285	27	9	281	35	13	313	35	11
Magdeburg	284	27	9	281	38	14	313	35	11
Schleswig-Holstein	274	47	17	281	49	17	313	59	19
Thueringen	284	26	9	281	26	9	313	35	11
Anatoliki mak., Thraki	376	120	32	325	102	32	358	27	8

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Kentriki makedonia	390	143	37	325	119	37	358	45	13
Dytiki makedonia	387	139	36	325	116	36	358	42	12
Thessalia	393	149	38	325	123	38	358	49	14
Ipeiros	570	189	49	325	160	49	358	90	25
Ionia nisia			15	325	49	15	358	4	1
Dytiki ellada			15	325	49	15	358	4	1
Sterea ellada			15	325	49	15	358	4	1
Peloponnisos	372	114	30	325	98	30	358	22	6
Attiki			15	325	49	15	358	4	1
Voreio aigaio			15	325	48	15	358	4	1
Notio aigaio			15	325	49	15	358	4	1
Kriti			15	325	49	15	358	4	1
Galicia	301	87	29	276	80	29	306	71	23
Asturias	303	88	29	276	80	29	306	72	23
Cantabria	309	70	23	276	62	23	306	52	17
Pais vasco	312	75	24	276	66	24	306	56	18
Navarra	314	78	25	276	68	25	306	59	19
Rioja	315	79	25	276	69	25	306	59	19
Aragon	314	76	24	276	67	24	306	57	19
Communidad de Madrid	311	93	30	276	83	30	306	75	24
Castilla-Leon	308	93	30	276	84	30	306	75	25
Castilla-la Mancha	309	93	30	276	83	30	306	75	25
Extremadura	300	93	31	276	85	31	306	77	25
Cataluna	314	76	24	276	67	24	306	57	19
Comunidad Valenciana			28	276	77	28	306	68	22
Baleares	299	93	31	276	86	31	306	78	26
Andalucia	299	93	31	276	86	31	306	78	26
Murcia			28	276	77	28	306	68	22
Canarias			15	276	41	15	306	28	9
Ile de france			15	274	41	15	300	32	11
Champagne-Ardenne	290	48	17	274	46	17	300	37	12
Picardie	288	18	6	274	18	7	300	7	2
Haute-Normandie	306	53	18	274	49	18	300	40	13
Centre	290	29	10	274	28	10	300	17	6
Basse-Normandie	306	61	20	274	56	20	300	47	16
Bourgogne	291	42	14	274	39	14	300	30	10
Nord-Pas-De-Calais	288	19	7	274	19	7	300	7	2
Lorraine	295	10	4	274	11	4	300	3	1
Alsace	296	10	3	274	10	4	300	3	1
Franche-Comte	323	78	24	274	67	24	300	60	20
Pays de la loire	294	68	23	274	66	24	300	57	19

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Bretagne	288	57	20	274	55	20	300	46	15
Poitou-Charentes	288	42	15	274	41	15	300	31	10
Aquitaine	288	41	14	274	40	14	300	30	10
Midi-Pyrenees	288	54	19	274	52	19	300	44	15
Limousin	288	56	19	274	53	19	300	46	15
Rhone-Alpes	313	43	14	274	38	14	300	29	10
Auvergne	288	41	14	274	39	14	300	29	10
Languedoc-Roussillon	286	47	16	274	45	16	300	36	12
Prov.-Alpes-Cote d'Azur	287	49	17	274	47	17	300	39	13
Corse			17	274	46	17	300	37	12
Border, Midlands, West.	260	66	26	260	67	26	284	62	22
Southern and Eastern	261	63	24	260	63	24	284	58	21
Piemonte	337	71	21	340	71	21	369	55	15
Valle d'Aosta	397	48	12	340	42	12	369	23	6
Liguria	400	43	11	340	36	11	369	17	5
Lombardia	353	67	19	340	65	19	369	48	13
Trentino-Alto Adige	455	50	12	340	42	12	369	23	6
Veneto	339	21	6	340	20	6	369	4	1
Friuli-Venezia Giulia	353	62	18	340	59	17	369	42	11
Emilia-Romagna	393	74	19	340	64	19	369	47	13
Toscana	358	102	28	340	96	28	369	82	22
Umbria	357	101	28	340	96	28	369	82	22
Marche	358	102	28	340	97	29	369	82	22
Lazio	374	165	44	340	149	44	369	140	38
Abruzzo	369	148	40	340	135	40	369	124	34
Molise	369	148	40	340	136	40	369	125	34
Campania	402	130	32	340	109	32	369	96	26
Puglia	401	123	31	340	104	31	369	90	24
Basilicata	401	124	31	340	104	31	369	91	25
Calabria	393	83	21	340	71	21	369	55	15
Sicilia	374	119	32	340	108	32	369	95	26
Sardegna	374	116	31	340	105	31	369	91	25
Groningen	307	101	33	319	104	33	354	98	28
Friesland	307	101	33	319	105	33	354	98	28
Drenthe	307	101	33	319	104	33	354	98	28
Overijssel	307	101	33	319	105	33	354	98	28
Gelderland	307	102	33	319	105	33	354	99	28
Flevoland	307	100	33	319	103	32	354	97	27
Utrecht	306	102	33	319	106	33	354	99	28
Noord-Holland	307	101	33	319	105	33	354	99	28
Zuid-Holland	306	102	33	319	106	33	354	99	28

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Zeeland	307	100	33	319	104	33	354	97	27
Noord-Brabant	307	100	33	319	104	33	354	97	27
Limburg (NL)	307	101	33	319	104	33	354	98	28
Burgenland			39	252	98	39	282	109	39
Niederoesterreich	363	111	39	252	75	30	282	83	29
Kaernten	287	85	30	252	79	31	282	88	31
Steiermark	283	89	31	252	77	31	282	86	30
Oberoesterreich	285	87	31	252	74	29	282	83	29
Salzburg	287	84	30	252	77	31	282	85	30
Tirol	285	87	31	252	77	31	282	85	30
Vorarlberg	285	87	31	252	72	29	282	80	28
Norte	296	31	10	298	31	10	335	5	2
Algarve	241	74	31	298	92	31	335	74	22
Centro	296	31	10	298	30	10	335	5	2
Lisboa	310	31	10	298	29	10	335	4	1
Alentejo	241	74	31	298	91	31	335	74	22
Acores	234	71	30	298	90	30	335	72	21
Madeira	234	71	30	298	90	30	335	72	21
Itae-Suomi	329	7	2	342	8	2	379	13	4
Etelae-Suomi	328	7	2	342	7	2	379	13	3
Laensi-Suomi	328	7	2	342	7	2	379	13	3
Pohjois-Suomi	328	7	2	342	8	2	379	13	4
Ahvenanmaa/Aaland	427	8	3	342	9	3	379	15	4
Stockholm	328	22	7	312	21	7	341	19	5
Oestra mellansverige	329	18	6	312	17	6	341	15	4
Sydsverige	329	18	5	312	17	5	341	14	4
Norra mellansverige	327	10	3	312	10	3	341	7	2
Mellersta norrland	327	8	3	312	8	2	341	4	1
Oevre norrland	327	8	2	312	9	3	341	4	1
Smaaland med Oearna	326	9	3	312	9	3	341	6	2
Vaestsverige	329	17	5	312	16	5	341	14	4
North East	263	16	6	254	16	6	278	14	5
North W. (incl. Merseyside)	263	16	6	254	16	6	278	14	5
Yorkshire and The Humber	263	16	6	254	16	6	278	14	5
East Midlands	266	9	4	254	9	3	278	6	2
West Midlands	263	3	1	254	2	1	278	3	1
Eastern	280	5	2	254	5	2	278	3	1
South East	270	4	1	254	3	1	278	3	1
South West	263	3	1	254	3	1	278	3	1
Wales	256	7	3	254	7	3	278	5	2
Scotland	263	14	5	254	13	5	278	11	4

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Northern Ireland	261	23	9	254	23	9	278	21	8
Praha	292	5	2	243	4	2	282	29	10
Strední Cechy	294	3	1	243	3	1	282	27	10
Jihozápad	273	3	1	243	3	1	282	27	9
Severozápad	272	4	1	243	3	1	282	28	10
Severovýchod	273	3	1	243	3	1	282	27	9
Jihovýchod	273	3	1	243	3	1	282	27	10
Strední Morava	273	3	1	243	3	1	282	27	9
Moravskoslezko	295	3	1	243	3	1	282	27	10
Közép-Magyarország	259	3	1	254	3	1	270	34	13
Közép-Dunántúl	257	3	1	254	3	1	270	33	12
Nyugat-Dunántúl	260	4	1	254	3	1	270	34	13
Dél-Dunántúl	257	3	1	254	3	1	270	34	13
Észak-Magyarország	261	6	2	254	6	2	270	37	14
Észak-Alföld	260	4	2	254	4	1	270	35	13
Dél-Alföld	258	3	1	254	3	1	270	34	13
Lódzkie	192	2	1	175	2	1	213	27	13
Mazowieckie	193	2	1	175	2	1	213	27	13
Malopolskie	203	2	1	175	2	1	213	27	13
Slaskie	203	2	1	175	2	1	213	27	13
Lubelskie	192	2	1	175	2	1	213	27	13
Podkarpackie	203	2	1	175	2	1	213	27	13
Swietokrzyskie	203	2	1	175	2	1	213	27	13
Podlaskie	193	2	1	175	2	1	213	27	13
Wielkopolskie	208	20	10	175	17	10	213	46	22
Zachodniopomorskie	234	2	1	175	2	1	213	28	13
Lubuskie	209	2	1	175	2	1	213	27	13
Dolnoslaskie	209	7	3	175	6	3	213	32	15
Opolskie	212	10	5	175	8	5	213	35	17
Kujawsko-Pomorskie	208	20	10	175	17	10	213	46	21
Warminsko-Mazurskie	210	2	1	175	2	1	213	27	13
Pomorskie	209	2	1	175	2	1	213	27	13
Bratislavský	266	3	1	243	3	1	277	17	6
Západné Slovensko	243	3	1	243	3	1	277	17	6
Stredné Slovensko	243	3	1	243	3	1	277	17	6
Východné Slovensko	243	3	1	243	3	1	277	17	6
Severozapaden				194			234	21	9
Severen tsentralen				194			234	21	9
Severoiztochen				194			234	21	9
Yugozapaden				194			234	21	9
Yuzhen tsentralen				194			234	21	9

	Pre Model estimates based on FADN data			CAPRI Model Base year (S1)			CAPRI Model Baseline (S3)		
	milk price	quota rent		milk price	quota rent		milk price	quota rent	
	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]	[€/t]	[€/t]	[% price]
Yugoiztochen				194			234	21	9
Nord-Est				187			173	24	14
Sud-Est				187			173	25	15
Sud				187			173	24	14
Sud-Vest				187			173	24	14
Vest				187			173	24	14
Nord-Vest				187			173	24	14
Centru				187			173	24	14
Bucuresti				187			173	24	14

Annex 2: Selected regional effects of milk quota abolition

Figure 26: Selected regional results for the Netherlands

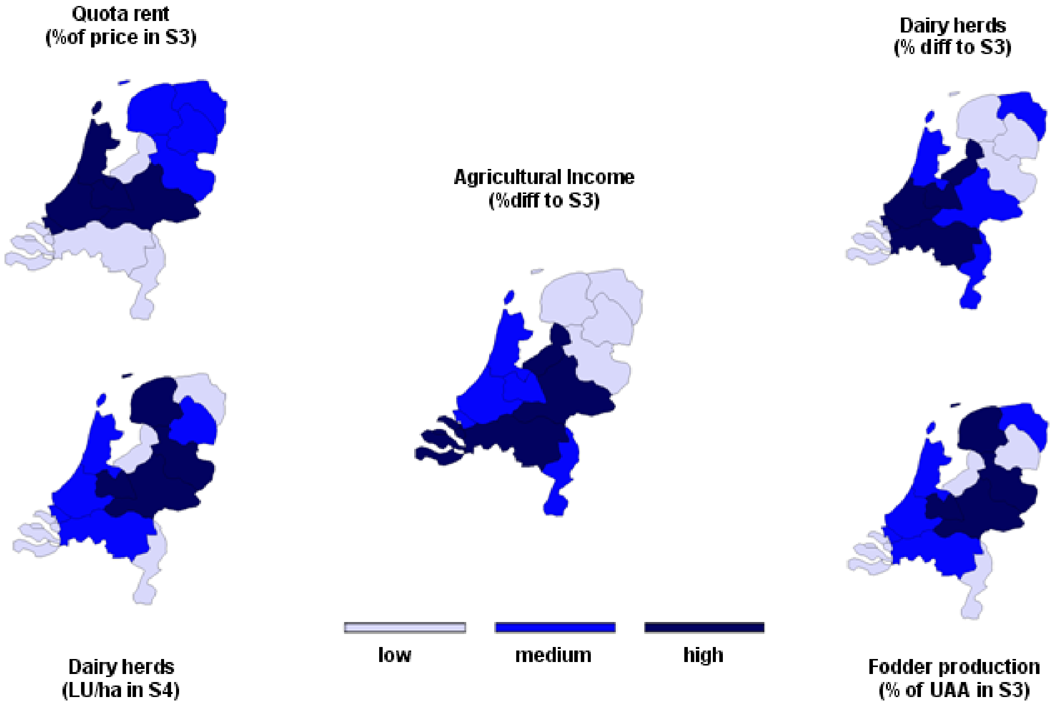


Figure 27: Selected regional results for Greece

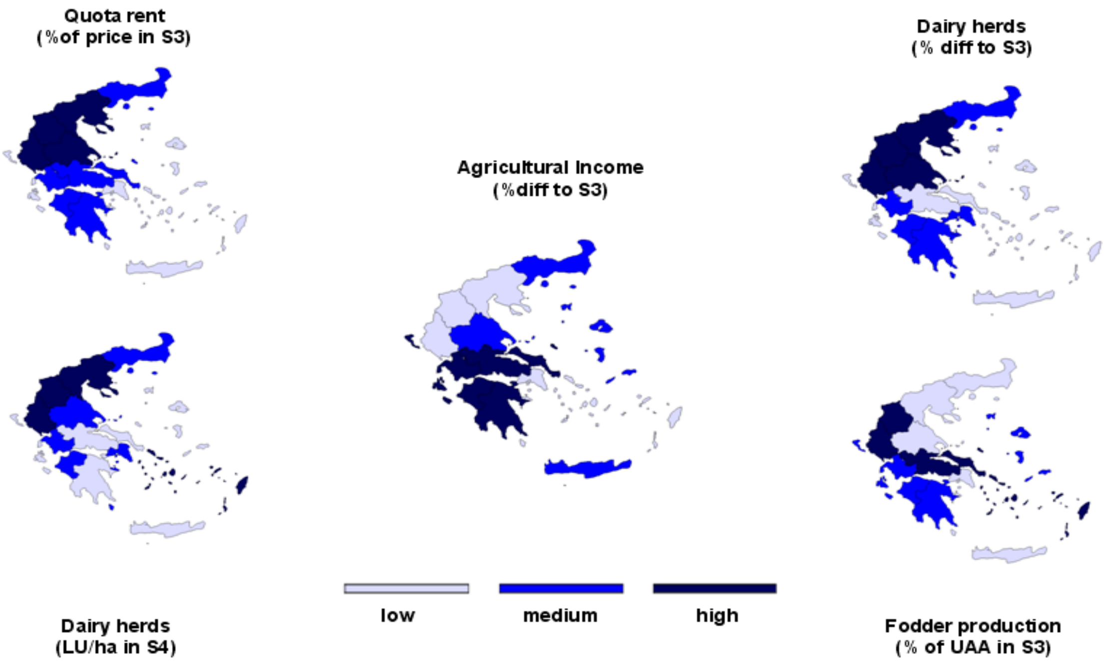


Figure 28: Selected regional results for Ireland

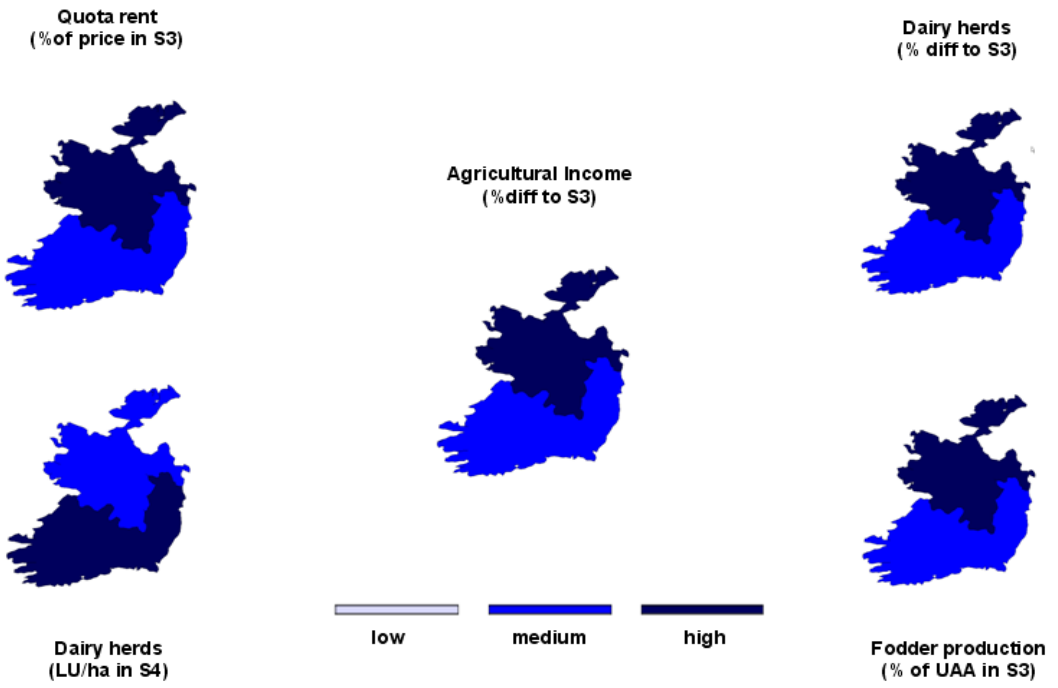


Figure 29: Selected regional results for Portugal

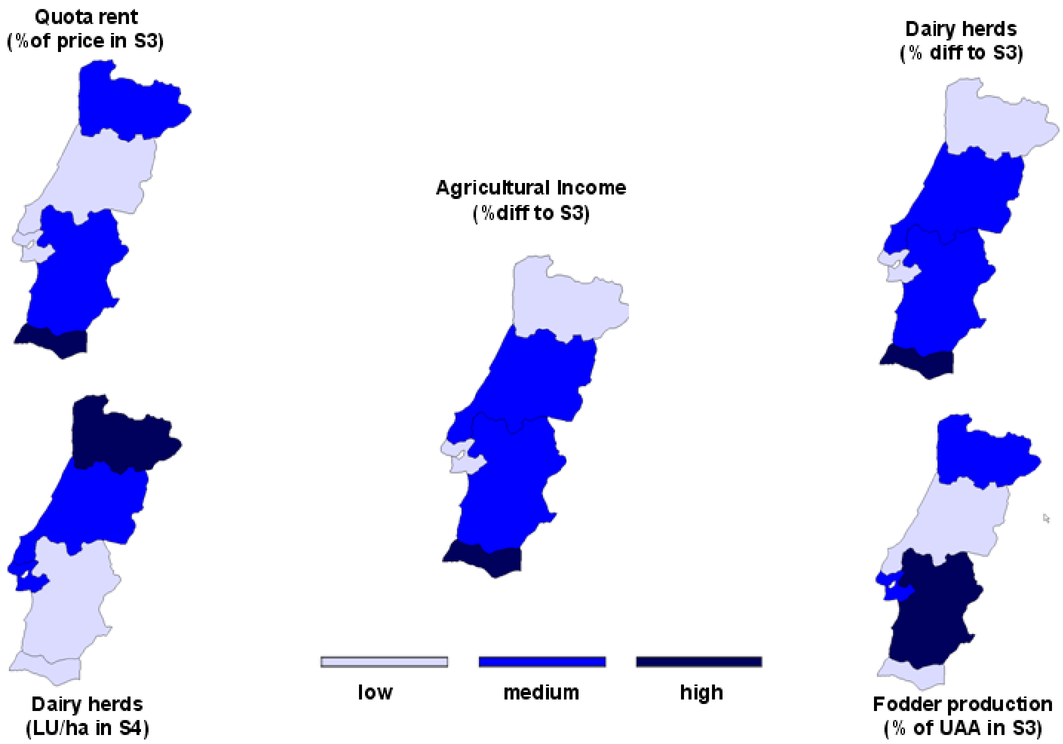


Figure 30: Selected regional results for Belgium

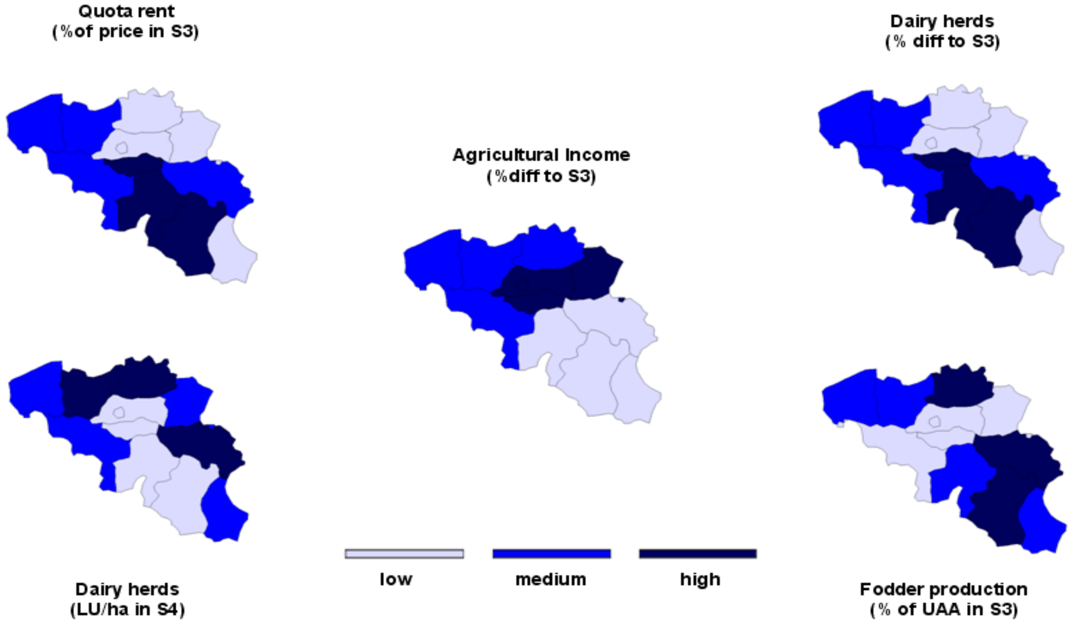


Figure 31: Selected regional results for Italy

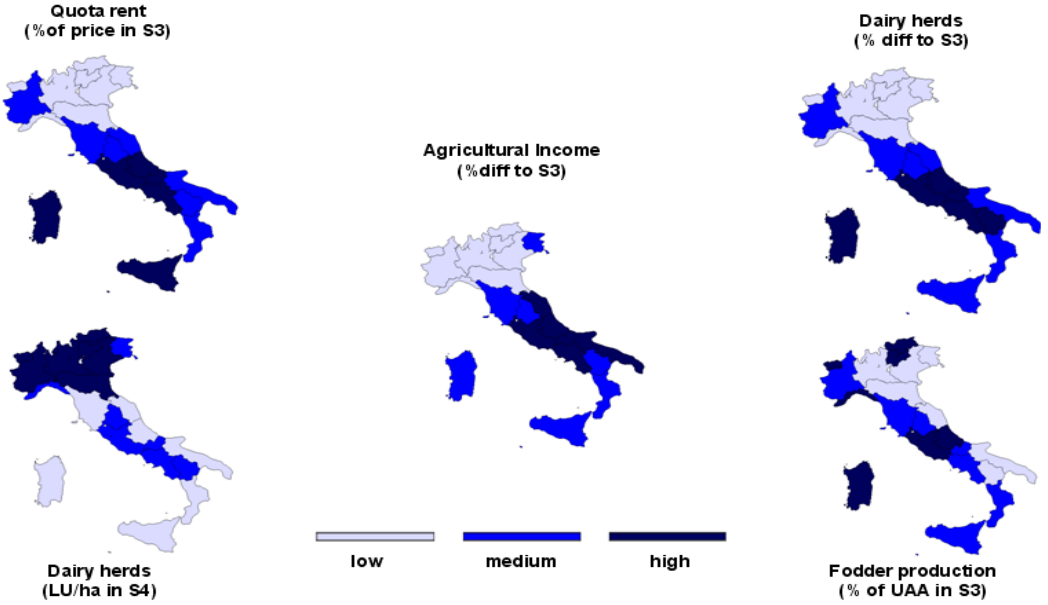


Figure 32: Selected regional results for Austria

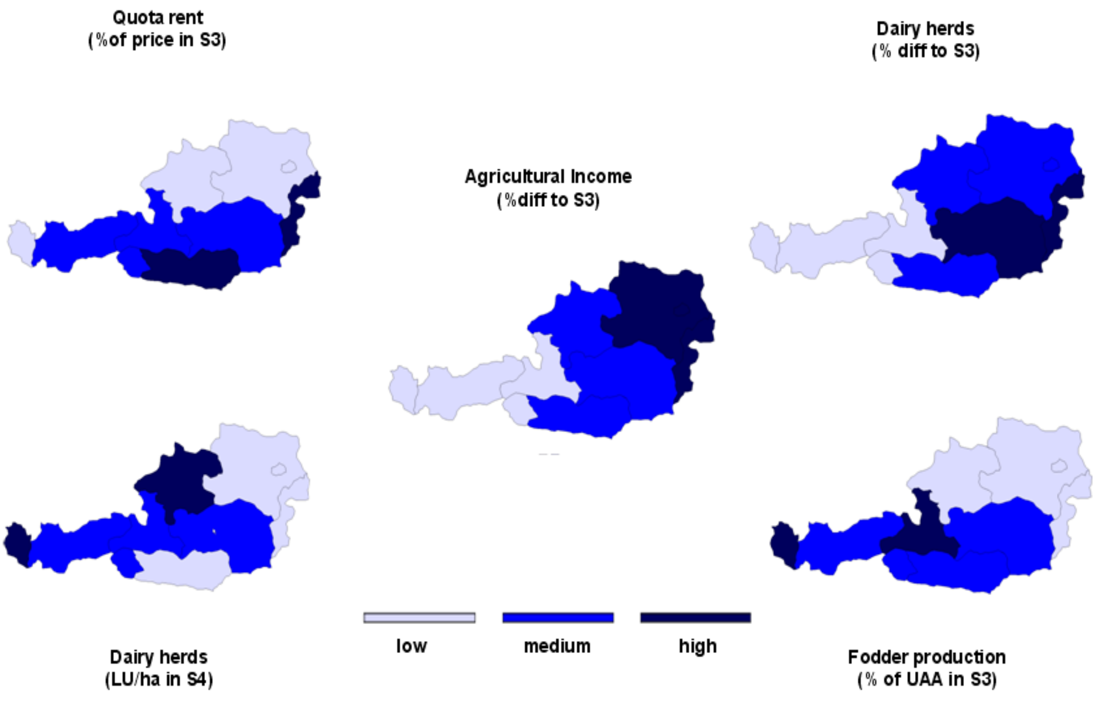


Figure 33: Selected regional results for Sweden

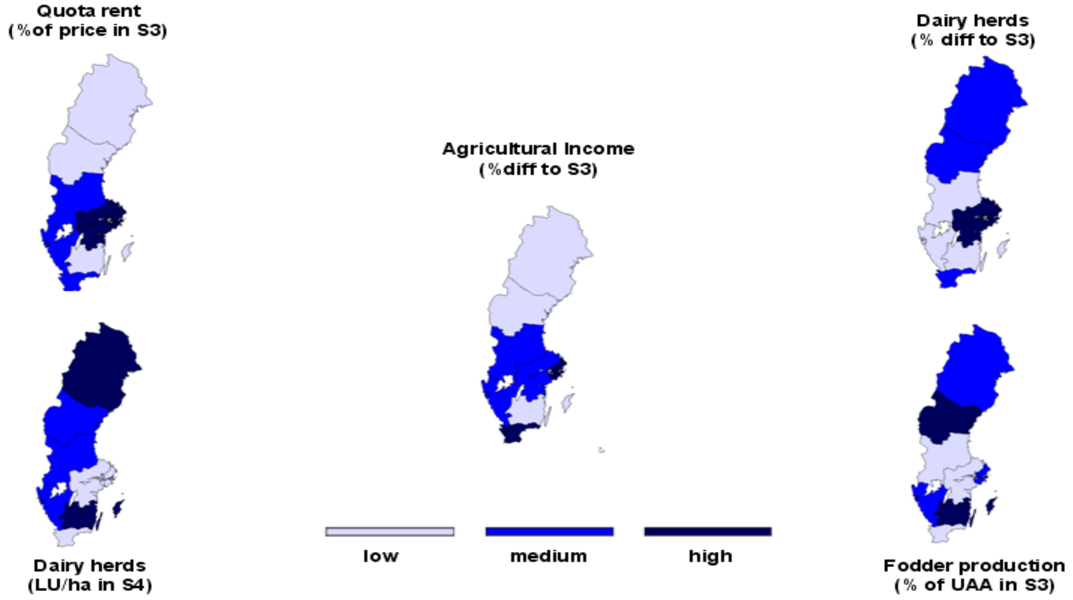


Figure 34: Selected regional results for Finland

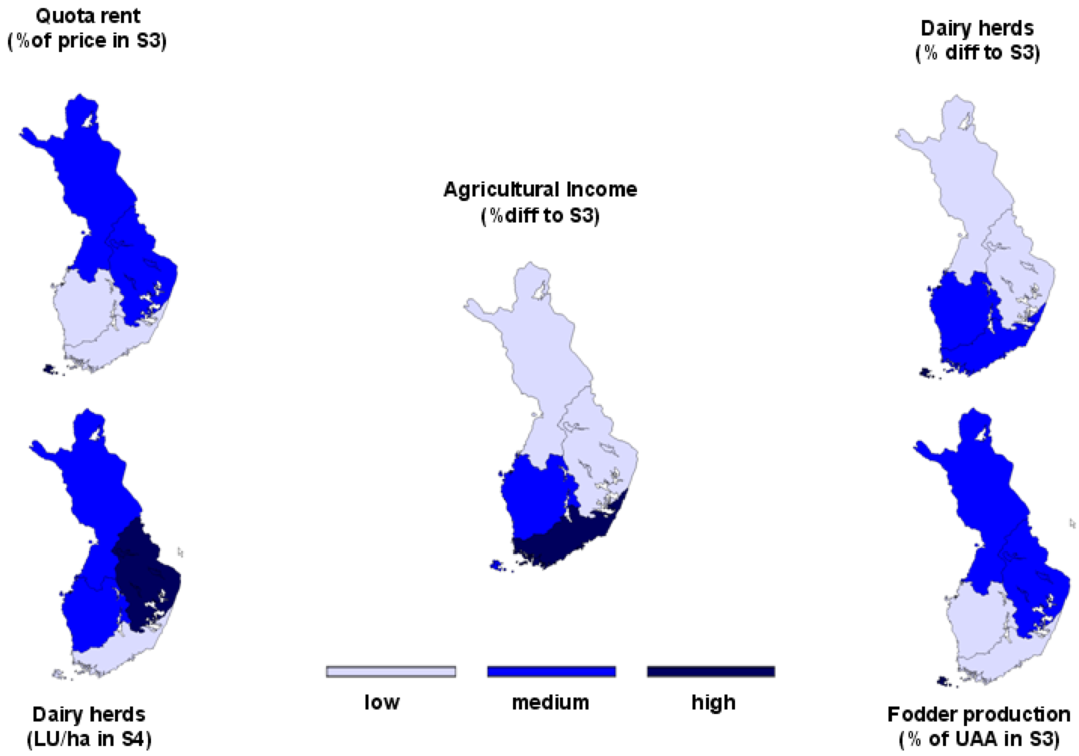


Figure 35: Selected regional results for Hungary

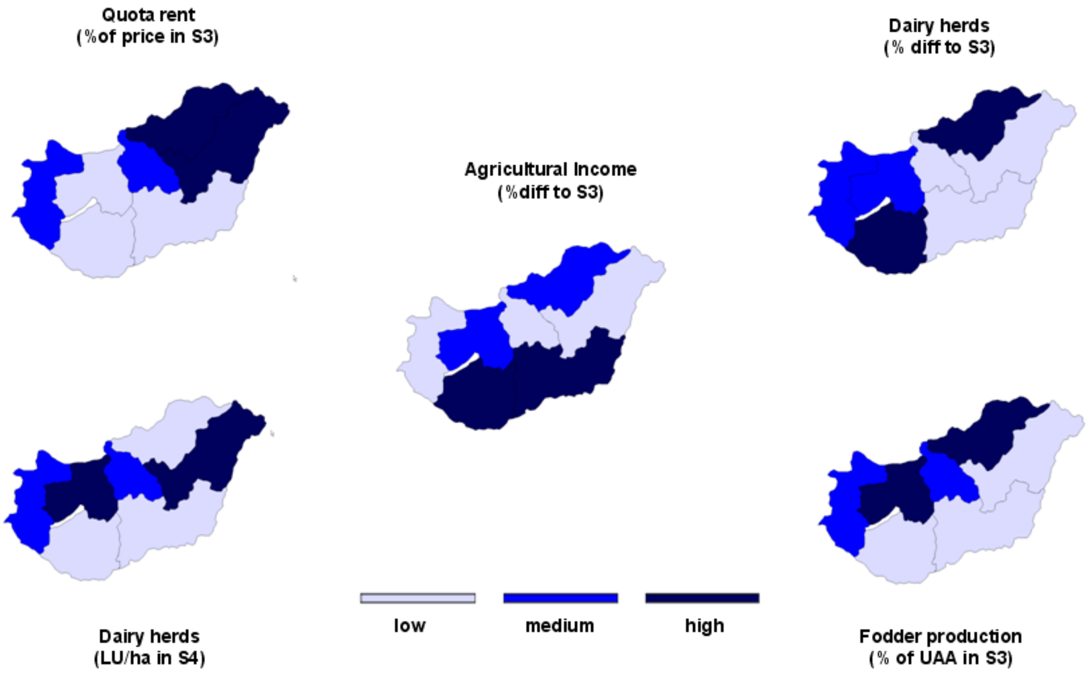


Figure 36: Selected regional results for the Czech Republic

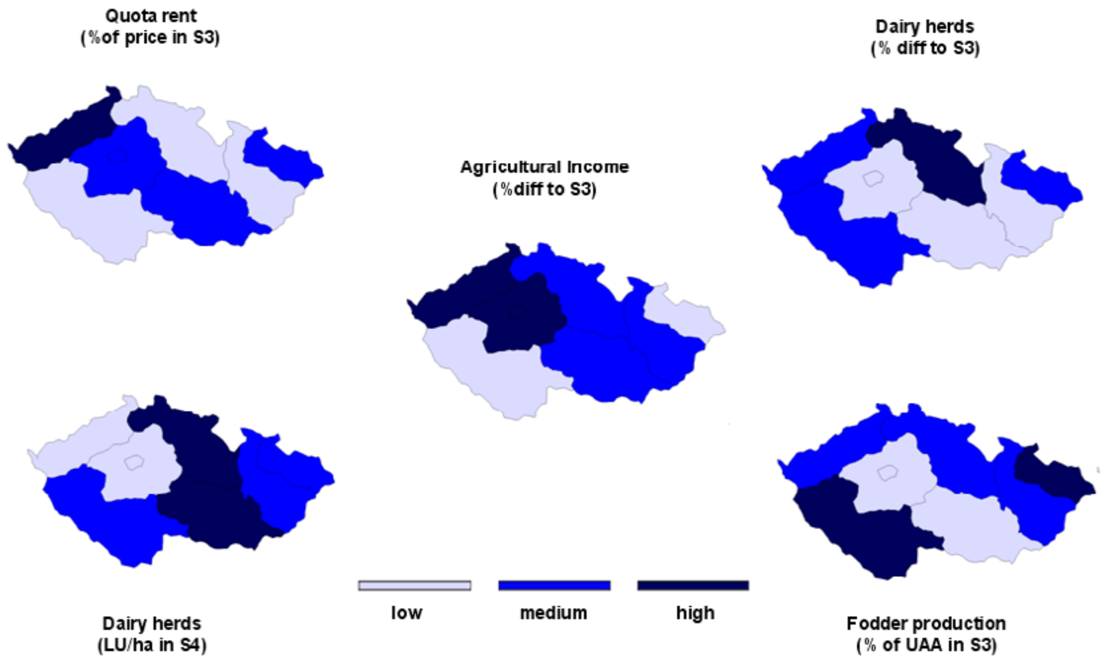


Figure 37: Selected regional results for the Slovak Republic

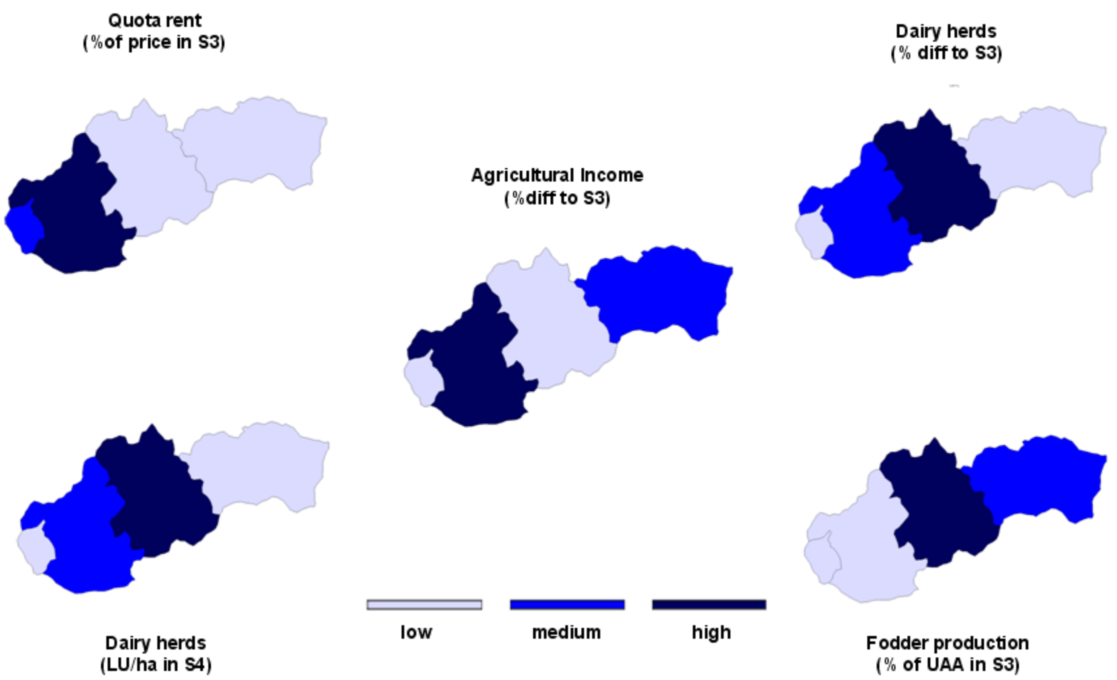
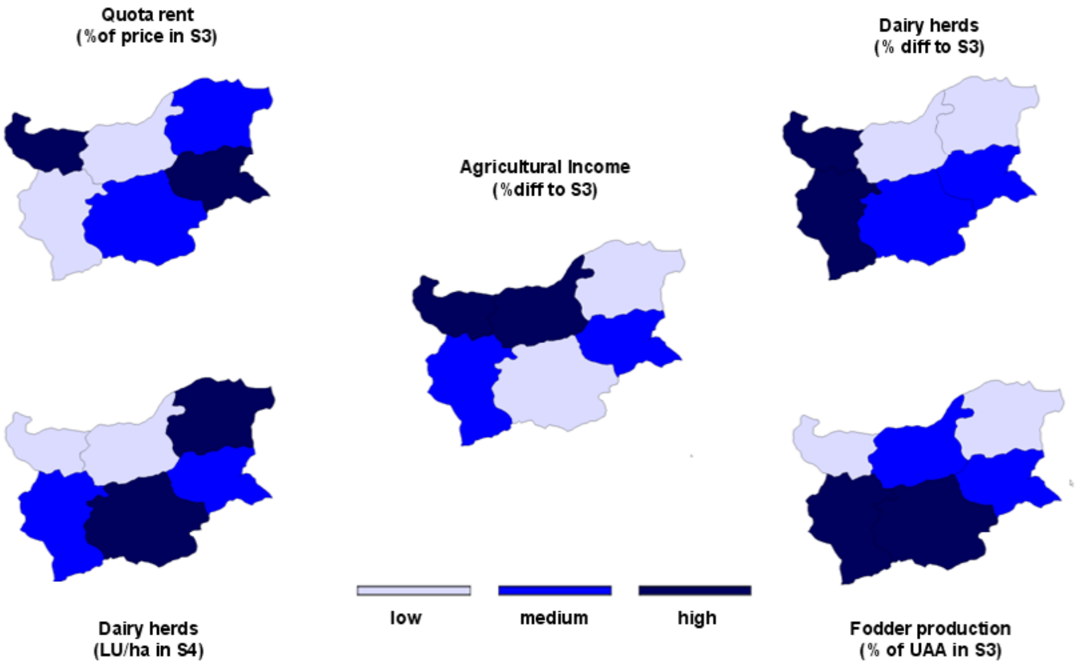


Figure 38: Selected regional results for Bulgaria



Annex 3: Validation of results

Annex 3.1: Data validation of ex-post results

In Table 39 the base year data of CAPRI are compared to specific data provided by DG AGRI for this study. Differences for the EU-27 are in the range of +0.2% for dairy cattle herds and milk production, being the differences in yields deemed negligible. This excludes misbehaviour by the model in the calibration process, being the remaining differences due to

a) the effect of the "averaging" of the base year (years 2003, 2004 and 2005 in CAPRI) and

b) distributional effects between dairy cattle numbers and yield positions when holding milk production constant[24].

Within the EU-27 aggregate, specific attention was put on the 'big' milk producers, like Germany (deviation +0.9%), France (deviation +0.5%), United Kingdom (deviation -0.6%) and Poland (-1%). Higher deviations are found in the

24 In principle, DG AGRI uses ESTAT data, as CAPRI. Nevertheless, differences between these two data sets could appear due to database updates and consistency restrictions (before entering the economic model, data in CAPRI are subject to a consistency check and differences to raw data might appear).

Table 39: Base year comparison between CAPRI and DG AGRI data for dairy herds, milk yields and cow milk production, 2004

	Base year (S1)			Base year AGRI (2004)			Diff CAPRI/AGRI (2004)		
Dairy herd	Dairy herd [1000 hd]	Yield [kg/hd]	Production [1000 t]	Dairy herd [1000 hd]	Yield [kg/hd]	Production [1000 t]	Dairy herd [%]	Yield [%]	Production [%]
Austria	552	5842	3223	543	5816	3160	1.51	0.46	1.98
Belgium-Lux.	610	5642	3444	605	5586	3378	0.94	1.01	1.96
Denmark	578	7950	4599	572	8050	4604	1.13	-1.24	-0.12
Finland	327	7512	2458	320	7670	2451	2.39	-2.06	0.28
France	3942	6270	24717	3956	6218	24598	-0.36	0.85	0.48
Germany	4316	6641	28664	4263	6665	28410	1.26	-0.36	0.89
Greece	150	5104	768	150	5035	757	-0.04	1.37	1.33
Ireland	1142	4635	5292	1120	4706	5268	1.98	-1.50	0.45
Italy	2069	5444	11263	1864	5802	10818	10.98	-6.18	4.12
Netherlands	1517	7200	10924	1513	7231	10942	0.28	-0.44	-0.16
Portugal	328	6229	2043	330	6084	2008	-0.61	2.39	1.76
Spain	1098	6038	6628	1064	6194	6591	3.15	-2.51	0.56
Sweden	401	8028	3216	399	8142	3245	0.52	-1.40	-0.89
United Kingdom	2106	6958	14657	2091	7053	14746	0.75	-1.34	-0.60
EU15	19137	6370	121896	18789	6439	120977	1.85	-1.07	0.76
Cyprus	26	5951	153	26	5961	154	-0.35	-0.17	-0.54
Czech Republic	412	6394	2633	438	6244	2738	-6.09	2.40	-3.84
Estonia	113	5620	636	115	5580	644	-2.00	0.72	-1.29
Hungary	288	6547	1887	300	6512	1951	-3.84	0.54	-3.32
Latvia	174	4369	761	186	4257	791	-6.25	2.64	-3.77
Lithuania	423	4230	1790	433	4223	1828	-2.22	0.16	-2.06
Malta	7	5592	40	8	5321	41	-7.96	5.09	-3.23
Poland	2656	4428	11759	2767	4293	11879	-4.03	3.15	-1.01
Slovac Republic	155	6053	936	205	5402	1107	-24.53	12.06	-15.43
Slovenia	128	5140	659	128	5127	658	-0.10	0.26	0.16
10 New MS	4382	4851	21254	4606	4731	21791	-4.87	2.53	-2.47
Bulgaria	363	3644	1322	359	3655	1314	0.97	-0.31	0.66
Romania	1502	3412	5124	1567	3322	5206	-4.17	2.71	-1.57
Bulgaria/Romania	1864	3457	6446	1926	3384	6519	-3.21	2.16	-1.12
EU27	25383	5893	149596	25322	5896	149288	0.24	-0.04	0.21

Source: Information provided by DG AGRI, L2 Unit, personal communication, 13/10/2008.

EU-12 NMS, with the Slovak Republic holding a deviation of -15%, due to inconsistencies in the data sets.

Annex 3.2: Data validation of baseline results

Milk production

Similarly to the case of the base year in Annex 3.1, the calibrated baseline is cross-checked with official projections for milk production and dairy cattle numbers at DG AGRI. Here disaggregated projection data for comparison are only available at EU-15 and EU-27 level, as reported in Table 40. Measured in differences of 2004-2020 trends (section (b) of Table 40), deviations for the EU-27 are +1.3% for milk production, +3% for dairy cow herds and -2.6% for milk yields.

Development of quota rents

The base year and baseline quota rents at MS level have been explicitly estimated within this study (see Pérez Domínguez *et al.* 2008) and subject to several 'plausibility' checks together with adjustments reflecting ongoing market developments. In order to calculate the shifters from 2004 to the 2020 baseline, available information from the EDIM model was used. In order to merge this information in the CAPRI model a simple rule for homogenisation of estimates was chosen. Basically, the changes in quota rents per Member State between 2005 and 2020 were taken from the EDIM model and weighted according to production in two blocks, the EU-15 and the EU-12 (i.e. MS base line rents = MS base year rents + 0.5* EDIM change in MS + 0.5 * EDIM change in the EU-15/EU-10). By doing this, some safeguard against particularities of specific MS in the database has been applied and a more homogeneous set of shifters was achieved.

The difference between the first two columns in Table 41 reflects the imposition of bounds on regional quota rents derived from plausibility and information on sale prices for quotas. Negative rents were thus transformed into small positive rents (in particular in the NMS) but huge deviations from statistical information on sale prices were also taken as evidence that the econometrics suffered from data base or other problems. As the projection has been aligned with the earlier EDIM study on other aspects, it was straightforward to adopt the information on the shifts of quota rents from EDIM as well, albeit in the form of the above 0.5/0.5 rule. Nevertheless, some exceptions from this rule had to be considered. The first exception to this rule is Greece where

Table 40: Baseline comparison between CAPRI and DG AGRI data for dairy herds, milk yields and cow milk production, 2020

(a) diff. of absolute 2020 values

	Baseline (S3)			Baseline AGRI (2020)			Diff CAPRI/AGRI (2020)		
Dairy herd	Dairy herd [1000 hd]	Yield [kg/hd]	Production [1000 t]	Dairy herd [1000 hd]	Yield [kg/hd]	Production [1000 t]	Dairy herd [%]	Yield [%]	Production [%]
EU15	17007	7291	124003	16773	7252	121643	1.39	0.54	1.94
EU27	22157	6822	151156	21325	6979	148821	3.90	-2.24	1.57

(b) diff. of 2004-2020 trends

	Baseline / Base year CAPRI			Baseline / Base year AGRI			Diff CAPRI/AGRI (2004-2020)		
Dairy herd	Dairy herd [% to S3]	Yield [% to S3]	Production [% to S3]	Dairy herd [% to 2004]	Yield [% to 2004]	Production [% to 2004]	Dairy herd [diff]	Yield [diff]	Production [diff]
EU15	-11.1	14.5	1.7	-10.7	12.6	0.6	-0.40	1.83	1.18
EU27	-12.7	15.8	1.0	-15.8	18.4	-0.3	3.07	-2.61	1.36

Source: Information provided by DG AGRI, L2 Unit, personal communication, 13/10/2008.

Table 41: Comparison between CAPRI and EDIM shifts for quota rents, 2004-2020

	Quota rent [2004]		Change [2004-2020]		Quota rent [2020]
	UNICATT estimate	CAPRI Model	EDIM change	CAPRI change	CAPRI
Belgium and Lux.	28.1	28.1	1.0	-0.7 *	27.6
Danmark	12.5	12.5	-4.0	-3.2 *	9.3
Germany	16.0	16.5	6.0	1.8 *	17.8
Austria	30.1	30.1	2.0	-0.2 *	29.9
Netherlands	32.9	32.9	-8.0	-5.2 *	27.8
France	16.6	17.1	-6.0	-4.2 *	12.6
Portugal	17.5	17.5	-15.0	-8.7 *	10.4
Spain	27.8	28.0	-9.0	-5.7 *	22.3
Greece	35.0	35.1		-24.0 **	11.7
Italy	20.0	20.0	-10.0	-6.2 *	14.0
Ireland	24.6	24.6	-5.0	-3.7 *	20.9
Finland	2.2	2.2	5.0	1.3 *	3.5
Sweden	4.2	4.2	0.0	-1.2 *	3.0
United Kingdom	3.9	3.9	0.0	-1.2 *	3.2
Czech Republic	1.2	1.2	7.0	8.4 *	9.6
Estonia	1.3	1.3	0.0	4.9 *	6.2
Hungary	1.4	1.4	13.0	11.4 *	12.8
Lithuania	5.0	5.0	0.0	4.9 *	9.9
Latvia	2.1	2.1	0.0	4.9 *	6.9
Poland	2.7	2.7	14.0	11.9 *	14.6
Slovenia	3.2	3.3	0.0	4.9 *	8.1
Slovak Republic	1.2	1.2	0.0	4.9 *	6.0
Cyprus	1.0	1.0	0.0	4.9 *	5.9
Malta	1.0	1.0	0.0	4.9 *	5.8
Bulgaria			9.0	9.0 ***	8.9
Romania			14.0	14.0 ***	13.8

** Average of EDIM shift and weighted EU-15/EU-10 average*
*** Own estimate accounting for significant quota increase in Greece after end of MC estimation period*
**** EDIM shift factor*

the recent increase in quotas has not been reflected in the database for the econometric estimation. As a consequence an exceptional downward correction has been applied. Another exception was the EU-2 where the EDIM estimates have been maintained at the MS level (rather than averaging). The final 2020 rents used in the simulations then follow simply as base year CAPRI rents + CAPRI change.

Annex 3.3: Sensitivity Analysis

This section aims to asses the uncertainty of the quota abolition scenario S4. Although the results of scenario S4 presented in the previous chapters are in line with results of other studies the simulations are based on model parameters that might be biased. The milk supply elasticity and the quota rents used to calibrate the CAPRI supply part are influencing the simulation results largely. Hence we calculated various quota abolition scenarios where those exogenous model parameters were varied.

Another source of uncertainty might be future development of international trade. An increasing worldwide demand for agricultural products might also increase potential EU dairy exports. This could naturally influence producer prices and milk supply. Additionally trade liberalization within the WTO negotiations might change market intervention in the European Union.

In the following subsections the effects of varying supply elasticities, quota rents, producer prices of milk and export subsidies will be investigated in more detail.

a) Elasticity of milk supply

The supply elasticity derived from econometric estimation enters the CAPRI model as an exogenous parameter used to determine the slope of the marginal cost function underlying the PMP based supply modules. The supply models can be successively calibrated to different supply elasticities before the quota abolition scenario S4 is simulated. We calculated 4 scenarios where we refer to as follows:

(1) ELAS_150: milk supply elasticity increased by 50%
(2) ELAS_125: milk supply elasticity increased by 25%
(3) ELAS_75: milk supply elasticity reduced by 25%
(4) ELAS_50: milk supply elasticity reduced by 50%

Compared to the standard quota abolition scenario the effect of elasticity variation on overall milk supply is quite small. Looking at prices it becomes clear that lower elasticities of milk production would lead to a lower price decline (ie. higher prices) for milk. The effect on the overall agricultural income is negligible.

As done in previous analysis of scenario S4 we calculated the frequency of European regions per clusters of percentage milk output change. While the effect on the overall European milk supply is small the pattern among regions changes.

The higher the elasticity underlying the simulation the wider the variety of regional effects. High elasticities tend to make the gap between "winning" and "loosing" regions bigger while lower elasticities produce more uniform changes among regions (cf. Figure 40)

b) Quota rents

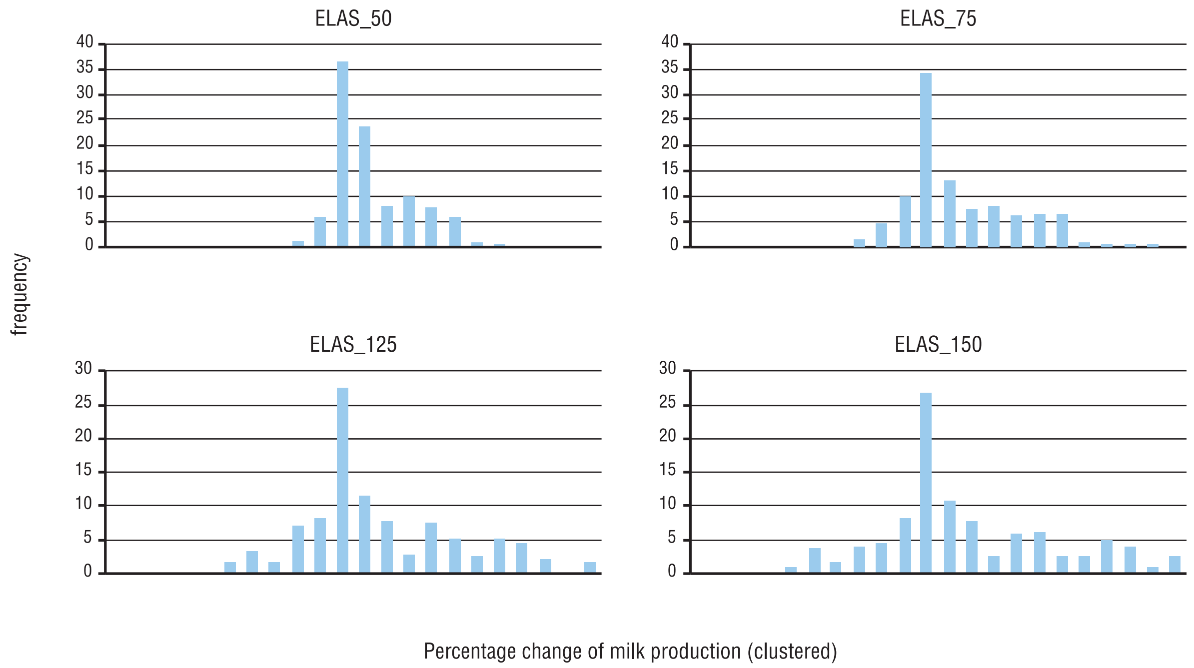
Similar to supply elasticities, quota rents enter the calibration of the CAPRI supply models as exogenous parameters. In order to assess the effects of different quota rents the following alternative scenarios were calculated:

(1) Quota rent increased by 5ct/kg milk
(2) Quota rent increased by 2ct/kg milk
(3) Quota rent decreased by 2ct/kg milk
(4) Quota rent decreased by 5ct/kg milk

Figure 39: Percentage change of milk production: scenarios S3 versus S4

	Baseline (S3)	Abolition (S4)	Variation of elasticity in S4			
			ELAS_150	ELAS_125	ELAS_75	ELAS_50
Milk Production	[1000t]	[% to S3]	[% to S3]	[% to S3]	[% to S3]	[% to S3]
EU15	124003	4.68	4.94	4.93	4.88	4.65
10 New MS	21222	3.30	3.50	3.43	3.37	3.31
Bulgaria/Romania	5931	3.28	3.61	3.49	3.00	2.32
EU27	151156	4.43	4.66	4.66	4.61	4.37
Producer Price Milk	[€/t]					
EU15	315	-10.27	-10.93	-10.48	-8.96	-7.52
10 New MS	231	-8.21	-8.57	-8.19	-6.98	-5.86
Bulgaria/Romania	186	-2.34	-2.39	-2.20	-1.74	-1.40
EU27	298	-9.80	-10.41	-9.97	-8.51	-7.13
Agricultural Income	[Mio €]					
EU15	203705	-2.07	-2.22	-2.11	-1.74	-1.41
10 New MS	20582	-2.08	-2.14	-2.04	-1.71	-1.43
Bulgaria/Romania	9112	-0.16	-0.40	-0.69	-0.65	-0.04
EU27	233399	-2.00	-2.15	-2.05	-1.70	-1.35

Figure 40: *Frequency of percentage changes based on different elasticity sets*



The quota rents were shifted in absolute terms since a percentage variation would not affect all those regions where the quota rent is assumed to be 0. Given that reference quota rents differ among countries from 0 – 40 ct/kg milk an error of +/- 5 ct/kg is quite possible.

Table 42: *Summary of simulation results with respect to different quota rents**

	Baseline (S3)	Abolition (S4)	Variation of production cost in S4			
			-5ct/kg milk	-2ct/kg milk	+2ct/kg milk	+5ct/kg milk
Milk Production	[1000t]	[% to S3]	[% to S3]	[% to S3]	[% to S3]	[% to S3]
EU15	126440	5.21	15.45	10.56	4.23	-0.46
10 New MS	21358	-0.62	9.73	3.77	-4.12	-10.12
Bulgaria/Romania	5906	0.47	6.81	2.47	-3.34	-7.44
EU27	153705	4.18	14.32	9.31	2.78	-2.07
Producer Price Milk	[€/t]					
EU15	267	-9.23	-21.05	-14.24	-5.09	1.83
10 New MS	198	-10.63	-16.27	-7.25	4.80	13.70
Bulgaria/Romania	169	-1.63	-3.77	-1.58	1.29	3.24
EU27	253	-0.16	-19.94	-12.97	-3.61	3.45
Agricultural Income	[Mio €]					
EU15	200220	-1.86	-3.33	-2.18	-0.79	0.13
10 New MS	20142	-0.36	-2.40	-0.98	0.60	1.46
Bulgaria/Romania	9076	-0.04	-0.20	-0.05	0.07	0.10
EU27	229438	-1.66	-3.11	-1.98	-0.62	0.26
Export subsidies dairy products	[Mio €]	[Mio €]	[Mio €]	[Mio €]	[Mio €]	[Mio €]
EU27	4	67	259	108	14	2

**Note: for this sensitivity analysis quota rents are considered positive or negative variations in variable costs of the corresponding regional supply model (e.g. an increase of quota rent by +5ct/kg milk means a corresponding reduction of 5ct/kg milk in production costs).*

Results of these different scenarios are presented for European country blocks. A more detailed discussion of effects would be beyond the scope of this section. The major finding is that different quota rents have significant effects on the overall increase in milk production, milk prices and agricultural income.

The change in milk supply can range from almost 0% to +14% in the European Union. At the same time milk prices vary from about -20% to 0%. The rather inelastic demand for milk products leads to declining agricultural income when quota rents are assumed to be higher, i.e. the increase in milk production cannot compensate the drastic drop in prices. Prices decrease although budgets for export subsidies of dairy products rise significantly.

c) Price development

Several market outlooks expect increasing worldwide demand for agricultural products. An argument for more market orientation in the dairy sector is that European farmers and dairy processors could benefit from this increasing demand only if there was no quota regime. As previous analysis of S4 pointed at losses of agricultural income, simulations were carried out where the producer prices for milk were fixed during simulation. Fixing prices in simulation means that the supply and market part cannot converge to equilibrium. Results of these scenarios can only be analysed with respect to supply model indicators.

The sensitivity of model results against variation of prices can be tested by varying milk prices in scenario S4 without the market model (i.e. only supply model working, so that prices remain as exogenous variables).

Milk prices in different MS were fixed depending on the final equilibrium price of S4. The scenario results can be understood in the way that they show effects on the supply side in case the market model over or underestimated milk prices.

In order to assess the effects of different producer prices for milk the following alternative scenarios were calculated:

(1) Milk price fixed at S4 price -10€/kg milk
(2) Milk price fixed at S4 price +10€/kg milk
(3) Milk price fixed at S4 price +30€/kg milk

An increase in milk price of 10€/tonne would lead to agricultural income at the baseline level. However milk supply increases significantly at the same time so that processed products from about 8 mio. tonnes of milk would have to be placed on the market (cf. Table 43).

d) Export subsidies

Export subsidies are likely to expire with the conclusion of the ongoing DDA round. Since export subsidies increase in our standard implementation of S4 there might be a significant impact on model results. However simulation results show only limited effects of no export subsidies (cf. Table 44).

Significant export subsidies are only paid for butter. Consequently production and market price for butter are considerably affected after an expiry of export subsidies. However production and prices of fresh milk products and cheese, which account for most of the production amount and value are more or less stable, i.e. the calculated change is within the range of the error term and cannot be avoided in an aggregated economic model. In the simulations the producer price for milk and dairy herds are not considerably affected.

Table 43: Summary of simulation results with respect to different milk prices

	Baseline (S3)	Abolition (S4)	Variation of Producer Price in S4		
			-10€/tmilk	'+10€/tmilk	'+30€/tmilk
Milk Production	[1000t]	[diff to S3]	[diff to S3]	[diff to S3]	[diff to S3]
EU15	126440	7561	1067	14115	27397
10 New MS	21358	-130	-1641	1408	4509
Bulgaria/Romania	5906	-23	-123	79	276
EU27	153705	7407	-697	15602	32183
Producer Price Milk	[€/t]	[€/t]	[€/t]	[€/t]	[€/t]
EU15	267	236	226	246	266
10 New MS	198	195	185	204	224
Bulgaria/Romania	169	169	159	179	199
EU27	253	228	218	238	258
Agricultural Income	[Mio €]	[% to S3]	[% to S3]	[% to S3]	[% to S3]
EU15	200220	-1.79	-2.79	-0.72	1.63
10 New MS	20142	-0.26	-1.91	1.49	5.40
Bulgaria/Romania	9076	0.02	-0.76	0.82	2.48
EU27	229438	-1.57	-2.62	-0.44	2.03

Table 44: Effects of expiry of export subsidies on dairy markets

	Baseline (S3)			Quota abolition (S4)			Quota abolition and no export subsidies		
EU27	Price [€/t]	Export Subsidies [Mio€]	Production [1000 t]	Price [% to S3]	Export Subsidies [Mio€]	Production [% to S3]	Price [% to S3]	Export Subsidies [Mio€]	Production [% to S3]
Butter	2743	5.4	1952	-7.35	53.0	4.82	-10.00	-	3.73
Skimmed milk powder	2373	0	920	-5.79	0	6.30	-4.78	-	5.27
Cheese	4176	0.4	9886	-5.59	2.2	1.31	-5.32	-	1.24
Fresh milk products	715	-	47193	-4.27	-	0.75	-4.24	-	0.74
Cream	1862	-	2636	-6.09	-	1.14	-7.53	-	1.41
Concentrated milk	2023	-	1160	-1.97	-	1.06	-1.92	-	1.00
Whey powder	494	-	1608	-8.30	-	14.00	-6.90	-	11.61
Casein and caseinates	6442	-	132	-6.09	-	9.02	-4.92	-	7.21
Whole milk powder	2874	-	789	-6.66	-	4.67	-6.37	-	4.47

Annex 4: Review of results from previous studies

Annex 4.1: Introduction

This section describes the underlying baseline assumptions and compares results of three model based assessments of the removal of milk quotas within the framework of the "Health Check" of the CAP. The three partial equilibrium models considered are:

- Agricultural Member States MODeling (AGMEMOD), (for further details see Chantreuil *et al.* 2008);
- Common Agricultural Policy SIMulation (CAPSIM), (for further details see Witzke and Tonini 2008);
- European Dairy Industry Model (EDIM), (for further details see Réquillart *et al.* 2008).

Table 45: Comparison of model characteristics

Criteria	AGMEMOD	CAPSIM	EDIM
General characteristics	Econometric, dynamic, multi-product, detailed Member State information	Calibrated, multi-periodic, rigorous microeconomic framework	Partly econometric, multi-periodic and recursive in supply, detailed dairy product coverage
Country coverage	EU-15 and EU-12 Member States	EU-27 Member States (and Western Balkan)	EU-15 and EU-10 Member States
Dairy product coverage	Butter, SMP, WMP, drinking milk, cream, other fresh products, cheese	Butter, SMP, WMP, fresh milk products, cheese, concentrated milk, whey powder and casein	Butter, SMP, WMP, casein, condensed milk, liquid milk, cream, fresh products and 6 categories of cheese
Data sources	EUROSTAT, FAO, USDA and national sources	EUROSTAT, supplementary sources (and national sources for Western Balkans)	Various sources
Simulation period	2000 - 2020	2004 - 2020	2005 - 2020
Policy instruments	Milk quotas, intervention, subsidies in processing and consumption, SPS, SAPS, TRQs, export subsidies	Various premium activities, set-aside, intervention, quotas (sugar and milk), domestic subsidies, tariffs, flexible levies/export refunds, WTO limits	Milk quotas, intervention, consumption and production subsidies, SFP, SAPS, TRQs, tariffs and export subsidies, WTO agreements
Quota rents	Calculated from EUROSTAT milk prices and marginal costs estimated by EDIM	Long run estimates for the EU-15 based on EDIM	Long run estimates for the EU-15 based on FADN micro data
Output	Supply, imports, exports, consumptions, stocks and prices	Market balances, agricultural production and income, consumer welfare and taxpayers impacts	Prices, production, consumption and trade for milk and the 14 dairy products

Source: Own table

The main characteristics of these three models compared in this section are presented in Table 45.

Annex 4.2: Description and comparison of baseline scenarios

a) Baseline description: AGMEMOD

The Baseline runs over the period 2000-2020 and it reflects agreed agricultural policy at the time that the analysis was completed in May 2008. It includes:

- The Luxembourg agreement of 2003;
- Milk quotas remain in place at the 2008/09 level throughout the projection period;
- 2008/09 quota expansion by 2% as agreed in March 2008;
- Butter and SMP intervention remain in place throughout the projection period;
- In view of the elevated price of cereals, the suspension of the set-aside regime agreed in 2007 is carried forward through the projection period by 2020;
- No further WTO reform occurs and the URAA conditions hold;
- Export subsidies and import tariffs remain 'on the books' and are used when required to support the producer milk price.

b) Baseline description: CAPSIM

CAPSIM is not intended to be a projection tool given its comparative static nature and the parameterisation mainly based on calibration to a base period. The baseline is carried out through the so-called reference run only for 2004, 2014 and 2020 and it reflects agreed agricultural policy at the time that the analysis was completed in July 2008. It includes:

- The Luxembourg agreement of 2003;
- 2008/09 quota expansion by 2% as agreed in March 2008;

- Mini milk reform package on the standardization of the protein content of SMP;
- Recent CAP reform (e.g. 2004 Mediterranean reform) and forecasts on policy driven variables (e.g. set-aside);
- In terms of direct support scheme the following are included: total payment amounts for coupled and decoupled support; sugar payments; specific support to tobacco, cotton, olives, hops; amounts exempted from modulation due to franchise.

c) Baseline description: EDIM

The Baseline runs over the period 2005-2015. In order to provide insights for the very long run the baseline is extended to 2020.It reflects agreed agricultural policy as defined by the Luxembourg agreement of 2003 including 1995 Uruguay Round trade agreement. It includes:

- A stepwise reduction of SMP and butter intervention prices by 15 and 25 percent respectively;
- A gradual increase of milk quotas between 2006 and 2009;
- A progressive introduction of direct payments reaching 35.5 €/tonne in the EU-15 Member States and 24.85 €/tonne in the EU-10 Member States in 2010-2011.

d) Comparison of baseline scenarios

In this Section price and production results for two reference situations (i.e. 2014 and 2020) are compared across the three different models as well as within each model over time. A strict comparison of baselines was not possible since base year starting data were not completely

Table 46: Comparison of baseline scenarios: cow milk, butter and SMP

EU27							
Cow milk	**Unit**	**Year**	**AGMEMOD**	**CAPSIM**	**EDIM**	**AGMEMOD/EDIM**	**CAPSIM/EDIM**
Price	euro/1000 kg	2014	305	253	289	5.52%	-12.43%
Production	1,000 ton	2014	152736	154499	139815	9.24%	10.50%
Price	euro/1000 kg	2020	315	280	294	7.28%	-4.69%
Production	1,000 ton	2020	151795	153773	140040	8.39%	9.81%
Price	Change	2014-20	3.43%	10.72%	1.73%		
Production	Change	2014-20	-0.62%	-0.47%	0.16%		
Price	Change	annual	0.56%	1.71%	0.29%		
Production	Change	annual	-0.10%	-0.08%	0.03%		
Butter	**Unit**	**Year**	**AGMEMOD**	**CAPSIM**	**EDIM**	**AGMEMOD/ESIM**	**CAPSIM/ESIM**
Price	euro/1000 kg	2014	3527	2959	2323	51.82%	27.39%
Production	1,000 ton	2014	2086	1933	1762	18.38%	9.69%
Price	euro/1000 kg	2020	3704	2944	2315	60.00%	27.17%
Production	1,000 ton	2020	2039	1907	1736	17.45%	9.87%
Price	Change	2014-20	5.03%	-0.51%	-0.34%		
Production	Change	2014-20	-2.25%	-1.32%	-1.48%		
Price	Change	annual	0.82%	-0.09%	-0.06%		
Production	Change	annual	-0.38%	-0.22%	-0.25%		
SMP	**Unit**	**Year**	**AGMEMOD**	**CAPSIM**	**EDIM**	**AGMEMOD/ESIM**	**CAPSIM/ESIM**
Price	euro/1000 kg	2014	2333	1913	2171	7.44%	-11.90%
Production	1,000 ton	2014	1221	858	820	48.94%	4.63%
Price	euro/1000 kg	2020	2241	2069	2220	0.94%	-6.82%
Production	1,000 ton	2020	1121	801	774	44.78%	3.55%
Price	Change	2014-20	-3.93%	8.15%	2.26%		
Production	Change	2014-20	-8.24%	-6.59%	-5.61%		
Price	Change	annual	-0.67%	1.31%	0.37%		
Production	Change	annual	-1.42%	-1.13%	-0.96%		

Source: Own table.

available. Therefore it was only possible to express changes from 2014 to 2020 for each model for the main dairy commodities. In Table 46 and Table 47 a comparison is established for the reference situations 2014 and 2020.

The two reference situations across the three different models highlight relatively high cream absolute prices for CAPSIM relatively to AGMEMOD and EDIM. This probably depends from the data sources used. However for policy impact analysis price changes and not absolute prices are important. The reference situations within each model over time highlight that price changes over the period 2014-2020 are large for CAPSIM relatively to AGMEMOD and EDIM with the exception of butter and cheese. Production changes are large for AGMEMOD relative to CAPSIM and EDIM. The largest absolute price changes are encountered in AGMEMOD for cheese, in CAPSIM for WMP, and in EDIM for SMP. The largest absolute production changes are large in AGMEMOD for SMP, in CAPSIM for SMP, and in EIM for WMP.

Annex 4.3: Comparison of scenarios on milk quota abolition

a) Scenario description: AGMEMOD

Four types of scenarios were performed in AGMEMOD:

- Milk 1: Expansion of the quota by 1% per year from 2009/10 to 2013/14; quota removal in 2015;
- Milk 2: Expansion of the quota by 2% per year from 2009/10 to 2013/14; quota removal in 2015;

Table 47: Comparison of baseline scenarios: WMP, cheese and cream

EU27							
WMP	**Unit**	**Year**	**AGMEMOD**	**CAPSIM**	**EDIM**	**AGMEMOD/ESIM**	**CAPSIM/ESIM**
Price	euro/1000 kg	2014	2708	2576	2310	17.24%	11.53%
Production	1,000 ton	2014	808	558	875	-7.61%	-36.18%
Price	euro/1000 kg	2020	2722	2916	2340	16.33%	24.61%
Production	1,000 ton	2020	744	532	823	-9.64%	-35.36%
Price	Change	2014-20	0.51%	13.18%	1.30%		
Production	Change	2014-20	-8.01%	-4.74%	-5.94%		
Price	Change	annual	0.08%	2.08%	0.22%		
Production	Change	annual	-1.38%	-0.81%	-1.02%		
Cheese	**Unit**	**Year**	**AGMEMOD**	**CAPSIM**	**EDIM**	**AGMEMOD/ESIM**	**CAPSIM/ESIM**
Price	euro/1000 kg	2014	4903	4605	n.a.		
Production	1,000 ton	2014	9605	9275	8989	6.86%	3.18%
Price	euro/1000 kg	2020	5253	4679	n.a.		
Production	1,000 ton	2020	9774	9630	9146	6.87%	5.29%
Price	Change	2014-20	7.14%	1.61%			
Production	Change	2014-20	1.76%	3.83%	1.75%		
Price	Change	annual	1.16%	0.27%			
Production	Change	annual	0.29%	0.63%	0.29%		
Cream	**Unit**	**Year**	**AGMEMOD**	**CAPSIM**	**EDIM**	**AGMEMOD/ESIM**	**CAPSIM/ESIM**
Price	euro/1000 kg	2014	1530	3290	1493	2.48%	120.34%
Production	1,000 ton	2014	2743	2635	2511	9.23%	4.96%
Price	euro/1000 kg	2020	1601	3515	1494	7.17%	135.25%
Production	1,000 ton	2020	2873	2635	2549	12.71%	3.39%
Price	Change	2014-20	4.64%	6.84%	0.07%		
Production	Change	2014-20	4.75%	0.00%	1.51%		
Price	Change	annual	0.76%	1.11%	0.01%		
Production	Change	annual	0.78%	0.00%	0.25%		

Source: Own table.

- Milk 3: as Milk 1, but intervention price of butter is cut by -2% per year starting in 2009;
- Milk 4: as Milk 2, but intervention prices for butter and SMP are cut by -2% per year, added by additional cuts of the subsidised export limits by -5% per year, all reductions starting in 2009.

b) Scenario description: CAPSIM

Three types of scenarios were performed in CAPSIM:

- Quota expiry scenario (EXPIRY, year 2020) where the year 2020, 5 years after the scheduled expiry in 2015, corresponds to the magnitude of medium run elasticities (about 0.3 for milk) and it is comparable with the long run EDIM 2008 results given for 2020 as well;
- A part of the Commission's quota expiry strategy is a soft landing policy involving a series of quota expansion steps. The situation after the last of these steps will be simulated as well (EXPIRY-SOFT, year 2014) and may be compared with the reference run results given for the same year;
- Early quota expiry scenario in 2009 (EXPIRY-FAST, simulation year 2014) to identify the impact of soft landing relative to early full quota expiry we will also simulate quota expiry results for 2014 which would follow from a hypothetical expiry some years earlier (in 2009). This is not politically relevant but may be interesting for a technical analysis and understanding of CAPSIM results.

c) Scenario description: EDIM

Four types of scenarios were performed in EDIM:

- Phasing out quotas: 1% annual quota increase from 2009-10 to 2014-15; quota removal in 2015-16; this scenario is named Q1;
- Phasing out quotas: 2% annual quota increase from 2009-10 to 2014-15; quota removal in 2015-16; this scenario is named Q2;
- Quota Removal in 2009-10; this scenario is named QR-09;
- Quota Removal in 2015-16; this scenario is named QR-15.

Baseline and the 4 scenarios only differ by the level of quota or the existence of the quota system. All the other elements of the policy mix are identical. In particular:

- The intervention prices are identical;
- When needed, domestic subsidies and export subsidies are used to maintain the domestic price of butter and SMP higher (or equal) to their respective intervention price;
- The trade policy is identical, that is the general rules are not modified.

d) Scenario comparison

The following scenarios (see Table 48) are compared: Milk 2 (AGMEMOD), Expiry (CAPSIM), and Q2 (EDIM).

By comparing scenario results of the AGMEMOD, CAPSIM and EDIM model based assessments of the removal of milk quotas with the reference run situations for 2020 it appears that:

- The three models produce closer results when focusing on production changes as compared to price changes, with the exception made for SMP and WMP;
- The three models produce the same direction of change, with a contraction in dairy prices and an increase in dairy production;
- AGMEMOD and CAPSIM tend to produce very similar results in terms of price changes for cow raw milk and SMP;
- AGMEMOD and EDIM tend to produce very similar results in terms of production changes for cow raw milk;
- CAPSIM and EDIM tend to produce very similar results in terms of production changes for cheese;

Table 48: Scenario comparison for 2020

Product		Unit	Reference 2020			Scenarios 2020			% Difference		
			AGMEMOD	CAPSIM	EDIM	AGMEMOD	CAPSIM	EDIM	AGMEMOD	CAPSIM	EDIM
Cow raw milk											
	price	euro/1000 kg	315	280	294	293	260	262	-7.19%	-7.21%	-10.88%
	prod	1,000 ton	151795	153773	140040	159293	158585	147317	4.94%	3.13%	5.20%
Butter											
	price	euro/1000 kg	3704	2944	2315	3339	2926	2216	-9.87%	-0.61%	-4.28%
	prod	1,000 ton	2039	1907	1736	2191	2038	1942	7.44%	6.85%	11.87%
SMP											
	price	euro/1000 kg	2241	2069	2220	2112	1961	1980	-5.75%	-5.20%	-10.81%
	prod	1,000 ton	1121	801	774	1275	873	987	13.78%	8.92%	27.52%
WMP											
	price	euro/1000 kg	2722	2916	2340	2539	2786	2144	-6.71%	-4.46%	-8.38%
	prod	1,000 ton	744	532	823	791	553	1046	6.41%	3.95%	27.10%
Cheese											
	price	euro/1000 kg	5253	4679	n.a.	4775	4550	n.a.	-9.09%	-2.75%	n.a.
	prod	1,000 ton	9774	9630	9146	10267	9860	9351	5.04%	2.39%	2.24%
Cream											
	price	euro/1000 kg	1601	3515	1494	1452	3506	1445	-9.30%	-0.25%	-3.28%
	prod	1,000 ton	2873	2635	2549	2936	2640	2569	2.20%	0.17%	0.78%

Source: Own table.

- AGMEMOD and CAPSIM tend to produce very similar results in terms of production changes for butter;
- EDIM produces the largest production changes for cow raw milk, butter, SMP and WMP.

Annex 5: Milk production trends

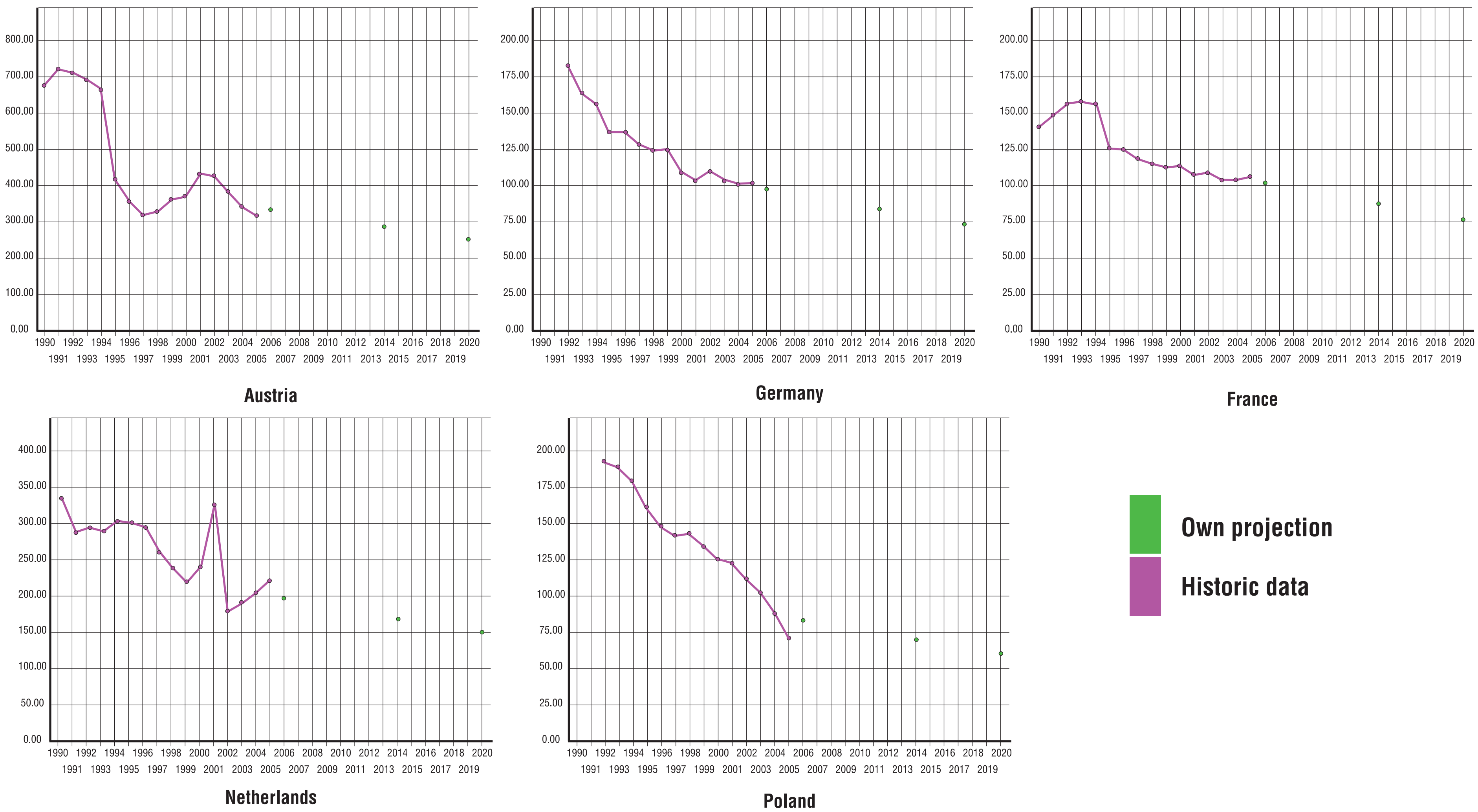
The demand side of cow milk in the CAPRI projection engine is disaggregated to

- Deliveries to dairy processing

Table 49: Changes cow milk production - detailed, 2004-2020

	Base year (S1)				Baseline (S3)					
	Quota production	Use on farm + losses		Production	Quota production (deliveries + dir. sales)		Use on farm + losses		Production	
	[1000 t]	[1000 t]	[% Quota Prod.]	[1000 t]	[1000 t]	[% to S1]	[1000 t]	[% to S1]	[1000 t]	[% to S1]
BL	3256	188	5.8%	3444	3326	2.2%	134	-29.1%	3460	0.4%
DK	4491	111	2.5%	4599	4638	3.3%	77	-30.7%	4715	2.5%
DE	27528	1137	4.1%	28664	28498	3.5%	799	-29.7%	29297	2.2%
EL	586	182	31.0%	768	671	14.6%	105	-42.4%	776	1.1%
ES	6145	483	7.9%	6628	6246	1.6%	317	-34.3%	6563	-1.0%
FR	23459	1258	5.4%	24717	24287	3.5%	870	-30.8%	25157	1.8%
IR	5222	70	1.3%	5292	5333	2.1%	36	-48.0%	5369	1.5%
IT	10773	490	4.5%	11263	10989	2.0%	355	-27.6%	11343	0.7%
NL	10657	271	2.5%	10924	10995	3.2%	183	-32.4%	11179	2.3%
AT	2786	437	15.7%	3223	2885	3.6%	307	-29.6%	3193	-0.9%
PT	1845	199	10.8%	2043	1912	3.7%	144	-27.6%	2056	0.6%
SE	3173	43	1.4%	3216	3285	3.5%	30	-31.4%	3314	3.1%
FI	2384	74	3.1%	2458	2468	3.5%	50	-32.6%	2518	2.4%
UK	14351	305	2.1%	14657	14858	3.5%	206	-32.7%	15063	2.8%
CY	133	20	15.0%	153	136	2.0%	14	-27.7%	150	-1.8%
CZ	2563	71	2.8%	2633	2669	4.1%	44	-38.8%	2713	3.0%
EE	535	101	18.8%	636	601	12.2%	69	-31.1%	670	5.3%
HU	1621	266	16.4%	1887	1689	4.2%	192	-27.6%	1882	-0.2%
LT	1244	546	43.9%	1790	1547	24.4%	355	-34.9%	1903	6.3%
LV	475	286	60.3%	761	644	35.5%	183	-36.2%	827	8.5%
MT	38	1	3.5%	40	43	10.9%	1	-27.9%	44	9.5%
PL	8489	3270	38.5%	11759	9061	6.7%	2261	-30.9%	11322	-3.7%
SI	531	128	24.0%	659	584	9.8%	92	-27.6%	676	2.6%
SK	878	58	6.6%	936	998	13.7%	39	-32.9%	1037	10.8%
BG	961	362	37.6%	1322	999	3.9%	262	-27.6%	1260	-4.7%
RO	2979	2145	72.0%	5124	3118	4.7%	1553	-27.6%	4671	-8.8%

Figure 41: Milk used for feeding for selected countries (historic time series + own projection)



- Direct sales
- Feed use on farm
- Losses

Future deliveries to dairy processing and direct sales depend on the planned changes in allocated quota and our assumptions on quota fulfilment tendencies. For most MS this results in an increase of milk production about 2-4% within the quota regime. Some countries, e.g. Greece, show higher increases due to MS specific agreements.

Own projections suggest that use of milk on farm and losses decline over time rather significantly (see Figure 41 for illustration). Depending on the relative importance of that alternative milk consumption in each country the overall change in milk production can even become negative.

Annex 6: Data consolidation in the dairy sector: the examples of Italy and the Slovak Republic

It is often the case that national and ESTAT data, but also different ESTAT domains and sometimes even the numbers in a single market balance are not fully consistent with each other.

The CAPRI modelling database is established in a routine called Complete and Consistent Data Base (COCO) based on various types of official data (see Britz 2008, section 2.3). This routine allows for conversion of units, trend based completions, mechanical corrections of presumed data errors while imposing some minimal technical consistency in terms of adding up constraints for areas and so forth in two steps:

1. Include and combine input data according to some overlay hierarchy;

2. Calculate complete and consistent time series while remaining close to the raw data.

The second step implies that the modelling database may deviate from raw data from ESTAT, sometimes in a non-negligible way, if the inconsistencies were significant. It should be acknowledged that these inconsistencies are not always visible in the original ESTAT tables because we are often collecting data from different tables and sometimes domains. The examples of Italy and the Slovak Republic are interesting because the CAPRI data shown in Table 39 deviate significantly from the DG AGRI data (close to ESTAT) on an important variable such as the number of dairy cows (cf. Table 50)

Table 50: Adjustments of raw data from ESTAT in the data consolidation procedure COCO in Italy, 1000 heads

	Raw data			Consolidated data		
	2000	2001	2002	2000	2001	2002
dairy cows	1988	2001	2063	2142	2156	2208
output coefficient male calves	0.45	0.45	0.45	0.59	0.64	0.64
output coefficient female calves	0.45	0.45	0.45	0.54	0.59	0.59
suckler cows	583	505	492	622	585	540
output coefficient male calves	0.45	0.45	0.45	0.56	0.61	0.64
output coefficient female calves	0.45	0.45	0.45	0.52	0.56	0.59
total supply calves	**2313**	**2255**	**2299**	**3101**	**3328**	**3371**
heifers slaughtered or net exported	522	489	556	519	495	538
heifers raised = cows slaughtered + stock change cows in t+1	519	344	558	518	489	484
sum heifers used	1041	833	1114	1036	984	1022
raising of female calves	833	1114	1023	984	1022	1062
bulls slaughtered or net exported	1404	2080	1996	1404	1613	1730
raising of male calves	2080	1996	1781	1613	1730	1724
total raising of calves	2913	3110	2804	2597	2752	2786
slaughtering of calves	1109	1104	1075	505	575	585
total demand calves	**4021**	**4214**	**3879**	**3101**	**3328**	**3371**

On the supply side of calves the raw data include information on the herd size of dairy cows and suckler cows. The output coefficients of male and female calves are unobserved, but orders of magnitude are well known: an output coefficient of 0.45 per cow for calves of each sex acknowledges a small percentage of twins, a variable interruption between pregnancies as well as some moderate losses[25]. Multiplication of output coefficients with numbers of cows gives an estimated supply of calves of about 2.3 million heads in 2001-2003. Of course the output coefficients need not be 0.45 exactly but an output coefficient of more than 0.65 or less than 0.3 will be considered very unusual.

Demand for calves is ultimately derived from slaughtering data (including net exports of live animals) of various animal categories as well as changes in the herd size of cows. In particular we may infer the number of heifers raised in a given year from the sum of slaughterings of cows and increase in the cow herd next year. In turn the heifers used next year must have been raised this year. This permits to infer the number of female calves needed for raising in this year. Raising of male calves in a given year equals next years slaughterings of male adult cattle (including net exports of live animals). The final component of demand for calves is for slaughtering for production of veal which is directly given in the raw data. Adding up all calves raised and slaughtered in a given year yields about 4 million heads in terms of demand for calves in Italy in recent years.

Hence there is a huge inconsistency of supply and demand of calves which needs to be closed in some fashion. The right part of the table shows that the main adjustment occurs through a significant increase in the output coefficients, up to the technical limits which is conceivable under fortunate circumstances (0.65). However, this adjustment is not sufficient to close the original gap such that some key numbers like the dairy cow herd size and total slaughterings have to be adjusted as well.

The situation is similar in the Slovak Republic but with a change in sign: The raw data imply a huge excess supply of calves which needs to be eliminated. Again the adjustment occurs mainly through an adjustment of output coefficients. If technical bounds against implausible coefficients

Table 51: Adjustments of raw data from ESTAT in the data consolidation procedure COCO in the Slovak Republic, 1000 heads

	Raw data			Consolidated data		
	2000	2001	2002	2000	2001	2002
dairy cows	247	239	234	188	197	180
output coefficient male calves	0.45	0.45	0.45	0.29	0.28	0.28
output coefficient female calves	0.45	0.45	0.45	0.29	0.28	0.28
suckler cows	26	29	30	0	0	11
output coefficient male calves	0.45	0.45	0.45		0.40	0.43
output coefficient female calves	0.45	0.45	0.45		0.40	0.43
total supply calves	**245**	**241**	**238**	**108**	**111**	**111**
heifers slaughtered or net exported	18	12	12	24	19	12
heifers raised = cows slaughtered + stock change cows in t+1	37	29	44	40	34	44
sum heifers used	56	41	56	64	53	56
raising of female calves	41	56	57	53	56	55
bulls slaughtered or net exported	49	44	39	56	48	47
raising of male calves	44	39	36	48	47	43
total raising of calves	85	95	93	101	102	98
slaughtering of calves	3	3	3	7	9	13
total demand calves	**87**	**97**	**96**	**108**	**111**	**111**

25 COCO recognises that the split is commonly estimated to be 51:49 in favour of males which is ignored in the example for simplicity.

are hit other variables including the dairy herds have to adjust as well.

Note that the downward corrected aggregate output coefficient for both sexes is 0.56 calves born per cow in 2002 in the Slovak Republic. On the contrary this coefficient is estimated to be 1.23 in Italy. These large differences (certainly close to the limit of acceptable values) may be partly statistical artefacts but more uniform output coefficients would have required to deviate even stronger from the statistical raw data. These are partly in conflict with each other in these two countries. We may summarise that there is a large consolidation requirement because the dairy herd size data and slaughtering data are partly at odds with each other in Italy and the Slovak Republic. In other countries these conflicts are less severe such that a moderate adjustment of output coefficients is sufficient for consolidation together with much smaller adjustments in dairy cow herd size and slaughtering data. In general these adjustments are less than 5% in most cases but in Italy dairy herds were increased by about 10% and in the Slovak Republic decreased by about 25%.

Annex 7: Detailed illustration of fat and protein balancing in the baseline: the example of Austria

As the fat and protein balances relate to all nine dairy products and the two raw milk types all these have to be considered for a full account of changes in dairy product mix. Furthermore it is necessary to acknowledge small quantities of dairy products which are processed again in the dairy industry. Based on the information in the main report Austria may be a puzzling example because butter and skimmed milk production are strongly declining (by 34% and 28% respectively) whereas production of cow milk and cheese only decline by 0.9% and 1.6% respectively. Table 52 shows that the main compensation for the decline in demand for milk fat from butter comes from additional production of fresh milk products and cream as well as some increase in fat contents over time.

Table 52: Detailed changes in fat and protein balancing in the baseline: the example of Austria

	Fat content	Protein content	Processing	Production	Fat supply -demand	Protein supply -demand
			Base year 2004 (S1)			
Raw milk	4.3	3.4		2691.9	+11483	+9139
Cow milk				2672.8		
Sheep milk				19.1		
Butter	84.4	0.0	3.5	32.3	-2428	+0
Skimmed milk powder	1.4	34.9	1.4	7.1	-8	-199
Cheese	22.3	33.5	14.9	147.2	-2956	-4431
Fresh milk products	4.8	4.4	0.0	903.7	-4355	-3940
Cream	26.7	3.1	0.0	60.6	-1617	-187
Concentrated milk	6.3	8.4	0.0	12.7	-80	-106
Whole milk powder	26.2	31.1	0.1	1.2	-30	-35
Whey powder	0.9	10.6	0.0	10.1	-9	-107
Casein	0.7	89.3	0.1	1.6	-1	-133
Balance					+0	+0
			Baseline 2020 (S3)			
Raw milk	4.3	3.4		2668.9	+11385	+9060
Cow milk				2647.8		
Sheep milk				21.1		
Butter	84.8	0.0	3.5	21.4	-1519	+0
Skimmed milk powder	1.4	34.1	1.4	5.1	-5	-127
Cheese	23.4	34.1	14.9	144.9	-3037	-4438
Fresh milk products	5.1	4.1	0.0	966.5	-4894	-3951
Cream	27.0	3.1	0.0	67.4	-1820	-209
Concentrated milk	6.3	8.4	0.0	11.9	-76	-100
Whole milk powder	25.7	30.0	0.1	1.0	-24	-28
Whey powder	0.9	11.2	0.0	10.9	-9	-122
Casein	0.7	85.0	0.1	1.1	-1	-86
Balance					+0	-0
			% Change 2004 to 2020			
Raw milk	0.0%	0.0%		-0.9%		
Cow milk				-0.9%		
Sheep milk				10.4%		
Butter	0.5%		0.0%	-33.6%		
Skimmed milk powder	-0.1%	-2.3%	0.0%	-27.6%		
Cheese	4.6%	2.0%	0.0%	-1.6%		
Fresh milk products	5.1%	-6.2%		6.9%		
Cream	1.1%	0.3%		11.4%		
Concentrated milk	0.2%	0.2%		-6.0%		
Whole milk powder	-2.2%	-3.4%	0.0%	-17.1%		
Whey powder	0.6%	5.2%		8.1%		
Casein	-0.1%	-4.8%	0.0%	-31.1%		

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Title: Regional Economic Analysis of Milk Quota Reform in the EU

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Abstract

This report is based on the outcome of a study carried out by the European Commission's Joint Research Centre - Institute for Prospective Technological Studies (JRC-IPTS, Spain) in cooperation with EuroCARE (Bonn, Germany) and the collaboration of the Agricultural Economics Research Institute (LEI, the Netherlands) and the Catholic University of the Sacred Heart (Unicatt, Italy).

The report provides an economic impact assessment of possible implications of the Health Check of the Common Agricultural Policy (CAP), with an explicit focus on regional effects of a milk quota abolition in the EU-27 in the year 2015. For the analysis the CAPRI model was updated with econometric estimates of milk quota rents at regional level and simulation results are presented for the year 2020. The detailed spatial resolution allows identifying regions where economic changes are larger than visible from aggregated impacts at Member State or European level.

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